

**FAST REFERENCE
EMISSION DOCUMENT
VERSION 3**

MAY 1996



Ontario

**Ministry of
Environment
and Energy**

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FAST REFERENCE EMISSION DOCUMENT

VERSION 3

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FAST REFERENCE EMISSION DOCUMENT

VERSION 3

Report prepared by:

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Environmental Information and Systems Section
Environmental Monitoring and Reporting Branch
Ontario Ministry of Environment and Energy

Report prepared for:

Ontario Ministry of Environment and Energy

Preface

This version of the Fast Reference Emission Document (FRED V3) supersedes the previous versions of this series. This version contains the most recent emission information and is published for internal use and users who are involved in emission inventory development. Anyone who intends to apply the data in this document to emission projection, to program development, or to other activities is advised to get assistance from the original sources of the data. Please make any comments on the Ontario data to Peter Wong, by phone at (416) 235-6130, by fax at (416) 235-6037, or by mail to the following address:

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Abbreviations and Symbols

C & P	Conservation and Protection Section of Environment Canada
CO	carbon monoxide
CO ₂	carbon dioxide
CPPI	Canadian Petroleum Products Institute
EC	Environment Canada
EMRB	Environmental Monitoring and Reporting Branch (of MOEE)
EPA	(United States) Environmental Protection Agency (see USEPA)
FRED V2	Fast Reference Emission Document, Version 2
FRED V3	Fast Reference Emission Document, Version 3
kt	kilotonnes i.e. thousand metric tonnes
MOE	Ontario Ministry of the Environment (old name, see MOEE).
MOEE	Ontario Ministry of Environment and Energy (new name, see MOE).
NAPAP	National Acid Precipitation Assessment Program
NEDS	National Emissions Data System
NGL's	natural gas liquids (propane and butane for example)
NO _x	nitrogen oxides
OECD	Organization for Economic Co-operation and Development
PM	particulate matter
PM-10	particulate matter with a diameter of 10 microns or less.
RAC	Railway Association of Canada
SO ₂	sulphur dioxide
TGS	thermal generating station
USEPA	United States Environmental Protection Agency (see EPA)
VOC	volatile organic compound

Definitions

anthropogenic - Caused by man's activities.

standard pollutants - Sulphur dioxide, nitrogen oxides, volatile organic compounds, particulate matter and carbon monoxide.

Conversion Factors

To Convert From	To	Multiply By
Pound (lb)	Kilogram (kg)	0.4536
Ton (U.S. short ton)	Kilogram (kg)	907.2
Ton (U.S. short ton)	Metric Tonne (1000 kg)	0.9072

Acknowledgement

The data and information in this report is from various government agencies through published reports, unpublished internal reports and verbal communication. The Emission Inventory Task Group wishes to acknowledge the assistance from David Hall, Arun Deshpande and Dave Yap of the MOEE; from Marc Deslauriers, Libby Greenwood, Ian Stephenson and Sharon Philpott of Environment Canada; from the United States Environmental Protection Agency; as well as from staff of CW Environmental Consulting Inc. and L.D. Consulting Inc. who have assisted in preparing the emission estimates and producing this report. The Emission Inventory Task Group staff who have worked on this report are Peter Wong, Simon Wong and Patrick McInnis.

Introduction

What is FRED Version 3?

This document is the third edition of the Fast Reference Emission Document (FRED V3) published by the Emission Inventory Task Group of the Ministry of Environment and Energy. It replaces the first and second editions of the same series--FRED V1 and V2--which were published in March 1990 and June 1991 respectively. FRED is a compilation of air emission data from the emission inventories of various government agencies. Its purpose is to provide a quick and comprehensive look at the air emissions of standard pollutants (SO_2 , NO_x , VOC, CO and particulate matter) in Ontario, Canada and the United States. It also presents some information on carbon dioxide (CO_2), ammonia and alkaline dust emissions in Ontario. FRED V3 presents the latest air emissions data obtained by the Emission Inventory Task Group as of December 1995. Anyone who intends to apply the data in this document in emission-related project and program development is advised to contact the original sources of the data for assistance. Questions concerning the Ontario section of FRED V3, should be directed to the office listed in the Preface to this document.

FRED V3 consists of four sections, A, B, C and D for Ontario, Canada, the United States and combined Canada/United States, respectively. FRED V3 presents data on emission trends, annual emissions, and major emitters. 1985 and 1990 were selected as base years and more detailed information is provided for them. Graphs accompany most of the tables.

Since FRED V2 was published in 1991, new emission estimation methodologies have been developed, and more up-to-date emission information has been gathered. With these new methodologies and new information, emission estimates have been continually refined and updated. As a result, there are differences in some emission estimates between FRED V2 and FRED V3. Where such a difference occurs, the estimate in FRED V2 is out-of-date, and the estimate in FRED V3 is current.

Readers are reminded that emission inventory compilation is a dynamic process. The emission estimates presented in FRED V3 are subject to revision whenever more up-to-date methodologies and information become available. Any changes in the emission estimates will be reported in future versions of FRED. Future versions of FRED will also address more pollutants.

What is an Emission Inventory?

An emission inventory is a list of air pollution sources and the pollutant amounts emitted from each source. It is compiled for a specific geographic area. It describes in detail when, where and how the pollutants are emitted. Emission inventories categorize emission sources as point, area, mobile and fugitive sources.

- Point sources are single, non-mobile sources with significant emissions, such as power generating plants, factories, smelters and refineries.
- Area sources are generally a group of small sources such as residential, commercial and industrial districts. Area sources also include building fires, forest fires and fires prescribed for forest management.
- Mobile sources are road vehicles, off-highway engines, railroad engines, aircraft, ships, and all other engines.
- Fugitive sources include roads, construction activities, agricultural tilling, agricultural open burning, and wind erosion including wind erosion of stockpiles. These sources produce particulates. Landfills are fugitive sources of VOC's.

Emissions can generally be estimated with the following equation:

$$E = A \times EF \times \frac{100 - CE}{100}$$

Where:

E	=	emissions,
A	=	activity rate, (or base quantity)
EF	=	emission factor, and
CE	=	overall emission control (reduction) efficiency (in %)

At a factory, for example, emission reduction is done using emission control equipment. The factory would inform an emissions inventory group, such as the MOEE's Emission Inventory Task Group, what the efficiency is of each of its pieces of emission control equipment. The emission inventory group can gauge whether the company-provided efficiencies are reasonable, based on accepted ranges of efficiency for each type of equipment. Where a company does not know the efficiency of a piece of control equipment, the emission inventory group can use a default value.

Emission factors are values that are used to relate the quantity of a pollutant released to the atmosphere with the activity that releases the pollutant. Emission factors can be derived in many ways. The following ways are listed in descending order of accuracy:

Source-Specific

Emission information can be directly obtained from source-specific tests or from continuous emission monitors at a source. These methods provide the best emission information about the source when the source operates at the same conditions that were present during testing or monitoring.

Material Balance

The material balance approach may also provide reliable average emission estimates for a specific source. It is appropriate in situations where a high percentage of material is lost to the atmosphere (e.g. sulphur in fuel, solvent loss in processes without emission control devices). It may not be appropriate where the material is consumed or chemically combined in the process.

Engineering Judgement

If representative source-specific data cannot be obtained, emissions information may be obtained from the equipment manufacturer or from anyone who has conducted a reliable test on similar equipment.

Generic Emission Factors

These are the average of, or representative values from, various emission data for similar processes in the same source category. These factors are used to estimate long-term emissions.

Expert Technical Judgement

In cases where the above methods of deriving emission factors are unavailable or inappropriate, this method is used. In this method, an expert judgement is made, based on the emission history of the source, or based on the anticipated activities and equipment changes. This method can give very poor results compared to the above methods, and is therefore used as a last resort.

When compiling emission inventories, source-specific emission factors are always used where available, since they are the most accurate. If they are not available, then material balance emission factors are used where appropriate, since they are the second-most accurate emission factors. If material balance emission factors are not appropriate, then engineering judgement emission factors are used, and so on down the list of types of emission factors.

Accuracy of Emission Estimates in FRED V3 in General

Emission inventories are more accurate for some pollutants than for others because there are different estimation methodologies for different pollutants and because there are different kinds of sources. According to Environment Canada the following ranges of accuracy are typical of annual emission estimates in emission inventories:

- SO₂ and CO₂ accuracy is high - ± 10% at best.

- NO_x accuracy is medium - ± 30% at best.
- anthropogenic VOC accuracy is low, ranging from about -50% to about + 250%.
- natural VOC accuracy is very low, with estimates being off by a factor of 3 for some natural VOC's and off by a factor of 5 for others.

The reason that natural VOC emission estimates have a high level of uncertainty is that the model used to derive them relies on satellite imagery, land use data and meteorology. For natural VOC emission estimates, the USEPA uses a model called PC-BIES and Canada uses an adaptation of this model called Can-BIES. In Canada, natural VOC emissions account for 83% of all VOC emissions.

Accuracy of Ontario Emission Estimates in FRED V3

In the Ontario Emission Inventory, accuracy of emissions estimates is probably close to or within the accuracy ranges from Environment Canada that are stated above. Though the accuracy for some emission estimates may seem low, this level of accuracy is the state-of-the-art. The Ontario Emission Inventory was compiled by using the most accurate emission factors possible, as described above in "What is an Emission Inventory?".

Accuracy of an emission inventory depends on the budget and manpower committed to it. For example, the emission inventory for the Windsor '91 Air Quality Study was intensive and very accurate. It examined 79 point sources and selected area sources, for 23 selected toxics and toxic compounds, and 5 standard pollutants. By contrast the Ontario 1990 Industrial Emissions Survey (a component of the Ontario Emission Inventory) examines 1,200 point sources and only the 5 standard pollutants.

The Emission Inventory Task Group will continually revise the Ontario Emission Inventory as better data and improved emission estimation methodologies become available.

Sources of Data in FRED V3

The Emission Inventory Task Group of the Ontario Ministry of Environment and Energy provided all the Ontario data. Environment Canada's Pollution Data Branch, its Conservation and Protection Section as well as its Pollution Data Analysis Division provided all the data for the other provinces, through several published reports and through communications of unpublished, up-to-date data. Emission data for the United States were obtained from USEPA published reports and databases. Most tables in FRED V3 have footnotes listing the reports and/or government agencies from which the data came, with the dates. Tables in the

Ontario section (Section A) without such footnotes are from the Ontario MOEE. Please note that some tables in the United States and the combined Canada/United States sections (Sections C and D) have notes at the bottom, enclosed in a border. These notes are important and should always be read.

Some Important Points

Readers are reminded that there may be some discontinuities in the emission trends as a result of splicing together trend data from different reports and sources. Sometimes no single report contains the data for all the years in a trend, and then discontinuities are unavoidable. Anyone who intends to use data from this document is advised to get assistance from the original source(s) of the data.

In this document, Eastern Canada is defined as Manitoba plus all the provinces east of Manitoba; Western Canada is defined as Saskatchewan plus all the provinces west of Saskatchewan plus all of the Northwest Territories plus the Yukon Territory. The dividing line between the Western and Eastern U.S. is the line formed by the western borders of Minnesota, Iowa, Missouri, Arkansas and Louisiana.

In this document, all emission amounts--including all amounts from the U.S.--are reported in metric tonnes, or some multiple (often 1,000) of metric tonnes. One metric tonne equals one thousand kilograms.

Ontario

Please see the section "Emission Change Percentages", at the end of the Ontario Section of this report, for a description and explanation of the changes in Ontario emission estimates from FRED V2 to FRED V3.

For years, the Emission Inventory Group of the Ontario MOEE has been compiling the Ontario Emission Inventory. Methodologies from Environment Canada and the USEPA, as well as source-specific methodologies, have been used in estimating emissions. Raw data for the compilation of the Ontario Emission Inventory has been obtained from: i) the Ontario 1990 Industrial Emissions Survey conducted by the Ontario MOEE; ii) Statistics Canada information such as census results, end-use energy demand figures, etc.; iii) reports from organizations such as the Canadian Petroleum Products Institute (CPPI), the Canadian Steel Environment Association (CSEA) and Ontario Hydro; iv) Environment Canada Reports; and v) reports and publications from other ministries and public agencies.

The MOEE Emission Inventory Task Group should have Ontario PM-10 data by 1997. Please note that the U.S. section of this report presents PM-10 data and that this data cannot be directly compared to the particulate data in the Ontario

section. PM-10 is the fraction of particulate matter that has a diameter of 10 microns or less.

The Ontario emission amounts in this report are from the MOEE Emission Inventory Task Group. Please note that Environment Canada determines its own emission amounts for Ontario and that they may differ from the ones in this report.

In FRED V3, the Ontario point source emission trends have been updated with more recent information obtained from the Ontario 1990 Industrial Emissions Survey. The 1990 survey information was used to refine the estimates for years before and after 1990; therefore, the Ontario emissions presented in this document are a combination of reported and projected data.

Canada

Many of the Canada emission totals in this report differ from the totals available from Environment Canada. The main reason is that the Canada totals in this report were compiled using the Ontario totals from the MOEE Emission Inventory Task Group. Ontario totals determined by Environment Canada usually differ from those determined by the MOEE Emission Inventory Task Group.

United States

Please note that if you want to get a U.S. total emission amount for a pollutant in any given year, you should get the amount from an emission trend table. Do not get the amount from an annual pollutant emission table. The 1985 and 1990 annual pollutant emission tables do not provide up-to-date U.S. totals because their purpose is to provide the latest state-level amounts. The U.S. totals in them are not as up-to-date (May 1995) as the U.S. totals in the emission trend tables (October 1995).

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FAST REFERENCE EMISSION DOCUMENT

VERSION 3

SECTION A: ONTARIO EMISSIONS

Table A-1. Ontario SO₂ Emission Trend by Sector, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AREA SOURCES [1]										
Total Vehicles	16.7	17.4	18.3	21.4	21.8	21.3	21.5	22.3	22.9	23.8
Off-Highway Engines	6.2	6.4	6.7	7.7	8.0	7.3	6.6	6.5	7.0	6.8
Railroad	2.2	1.9	2.0	3.3	3.7	2.7	2.9	2.8	2.8	2.7
Aircrafts	0.5	0.5	0.7	0.7	0.7	0.4	0.4	0.4	0.4	0.4
Marine	9.8	16.0	18.9	18.6	20.5	19.3	19.0	19.8	18.9	15.2
Residential	10.6	9.5	9.2	9.5	9.7	8.4	7.2	7.5	8.0	10.9
Commercial	4.4	4.2	4.3	4.8	4.7	3.9	2.7	2.5	3.0	3.4
Industrial	6.8	9.7	10.2	12.0	10.9	15.3	8.2	8.9	7.7	5.9
Incineration	0.7	0.7	0.9	0.7	0.6	0.7	0.7	0.7	0.7	0.7
Forest Fire [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Fires [2]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dry Cleaning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Coating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Solvent Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Marketing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Misc. Processes	0.4	0.4	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.3
SUBTOTAL [5]	58.1	66.7	71.6	79.0	80.9	78.7	69.5	71.9	72.0	70.0
POINT SOURCES [3]										
Electric Utilities	336.7	269.8	332.5	320.6	305.5	195.0	166.5	156.7	95.3	106.2
Non-Iron Smelters	769.2	724.0	727.9	726.6	709.3	691.5	640.3	478.9	420.6	221.5
Other Primary Metals	53.9	57.2	56.5	56.4	55.8	48.2	46.7	48.6	49.2	49.2
Petroleum Refineries	64.0	60.1	64.2	64.9	67.7	63.9	62.3	63.7	65.5	64.5
Pulp & Paper	29.4	30.2	32.8	32.3	31.6	24.4	25.9	20.8	21.7	18.7
Chemicals	5.1	5.8	6.0	7.7	7.3	7.3	6.6	6.8	7.1	6.8
Other Manufacturing	27.3	32.0	34.9	40.5	38.8	34.8	29.1	28.1	29.4	29.4
Mining	116.6	96.5	84.6	78.6	68.6	47.0	54.6	36.6	54.6	51.7
Miscellaneous [4]	0.3	0.3	0.3	0.3	0.4	0.3	0.4	0.4	0.4	0.4
SUBTOTAL [5]	1,402.6	1,276.0	1,339.7	1,328.0	1,285.0	1,112.3	1,032.3	840.5	743.9	548.5
ONTARIO TOTAL [5]	1,460.7	1,342.7	1,411.3	1,407.0	1,365.9	1,192.1	1,101.8	912.4	815.8	618.5

Notes. [1] Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.

[2] Emissions from Forest Fires are for illustration only, they are not included in subtotals and totals.
Information on Fires Statistics were not available from 1990 onwards.

[3] Emission data are a combination of reported and projected emission estimates.

[4] Includes commercial or major institutional emissions.

[5] Components may not add up to totals due to rounding.

[6] Zero values represent no emissions or emissions less than 50 tonnes per year.

Figure A-1. Ontario SO₂ Emission Trend by Sector, 1985-1994

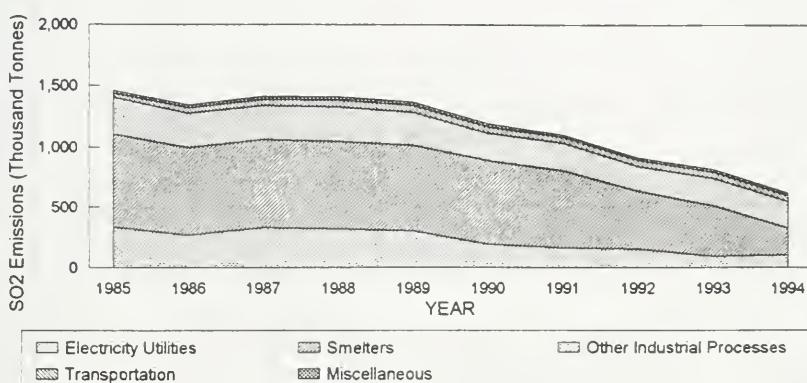


Table A-2. Ontario SO₂ Emission Trend by Major Sources, 1980-1994

(Thousands Tonnes)

EMITTERS	TYPE	LOCATION	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
INCO	Cooper & Nickel Smelter + Iron Ore Recovery Plant	Sudbury	812	723	328	459	683	695	635	659	687	637	617	572	420	358	162
FALCONBRIDGE	Nickel Smelter	Sudbury	123	114	61	79	84	74	85	65	65	68	70	64	54	57	54
ALGOMA STEEL	Iron Ore	Wawa	155	128	69	80	123	112	96	84	78	68	42	53	36	50	35
ONTARIO HYDRO	Utilities	Atikokan Toronto Windsor	0 16 1	0 6 4	0 1 6	0 1 1	0 0 0	0 0 0	2 27	4 46	5 48	4 56	4 56	3 37	2 30	2 12	2 6
- Aluskon	Mississauga	75	63	67	57	66	44	44	27	46	48	48	36	37	30	30	30
- Keim	Courttright	150	154	152	171	145	118	96	105	90	89	46	37	42	25	25	53
- Lakeview	Beth	0	1	2	1	2	1	1	2	4	2	4	2	3	2	0	1
- Lambton	Nanticoke	144	181	207	199	222	169	139	169	166	145	101	82	77	52	41	41
- Thunder Bay	Thunder Bay	10	9	9	9	10	5	6	9	10	7	6	5	5	5	4	4
DOFASCO	Iron & Steel	Hamilton															
STELCO	Iron & Steel	Hamilton	16	10	7	7	11	11	12	12	12	11	10	10	10	11	10
ALGOMA STEEL	Iron & Steel	Sault Ste Marie	12	9	6	7	8	15	15	15	15	15	11	13	14	14	13
ESSO PETROLEUM	Oil Refinery	Sarnia	23	27	25	23	25	22	27	29	26	27	23	22	23	23	20
SHELL CANADA	Oil Refinery	Corunna	16	15	13	12	14	13	13	14	13	13	14	14	14	14	12
PULP & PAPER	Pulp & Paper																
OTHER INDUSTRIES			128	129	127	118	119	75	72	76	68	69	65	75	74	81	101
POINT SOURCE SUB-TOTAL			1,682	1,572	1,086	1,222	1,511	1,403	1,276	1,340	1,328	1,285	1,112	1,032	841	744	549
AREA SOURCE SUB-TOTAL			77	70	55	52	55	58	67	72	79	81	80	70	72	72	70
ONTARIO TOTAL			1,768	1,642	1,140	1,274	1,667	1,461	1,343	1,411	1,407	1,366	1,192	1,102	912	816	619

[1] Emissions are estimated from information provided by the industries or by other sources. Data from other sources is related statistical information such as production quantity, energy consumption, etc. Emissions may be revised when more up-to-date information becomes available.

[2] Whenever emission estimates are not available, they are left blank.

[3] Zero values represent no emissions or less than 500 tonnes per year

Figure A-2.

**Ontario SO₂ Emission Distribution by Sector
- 1985, 1990 and 1994**

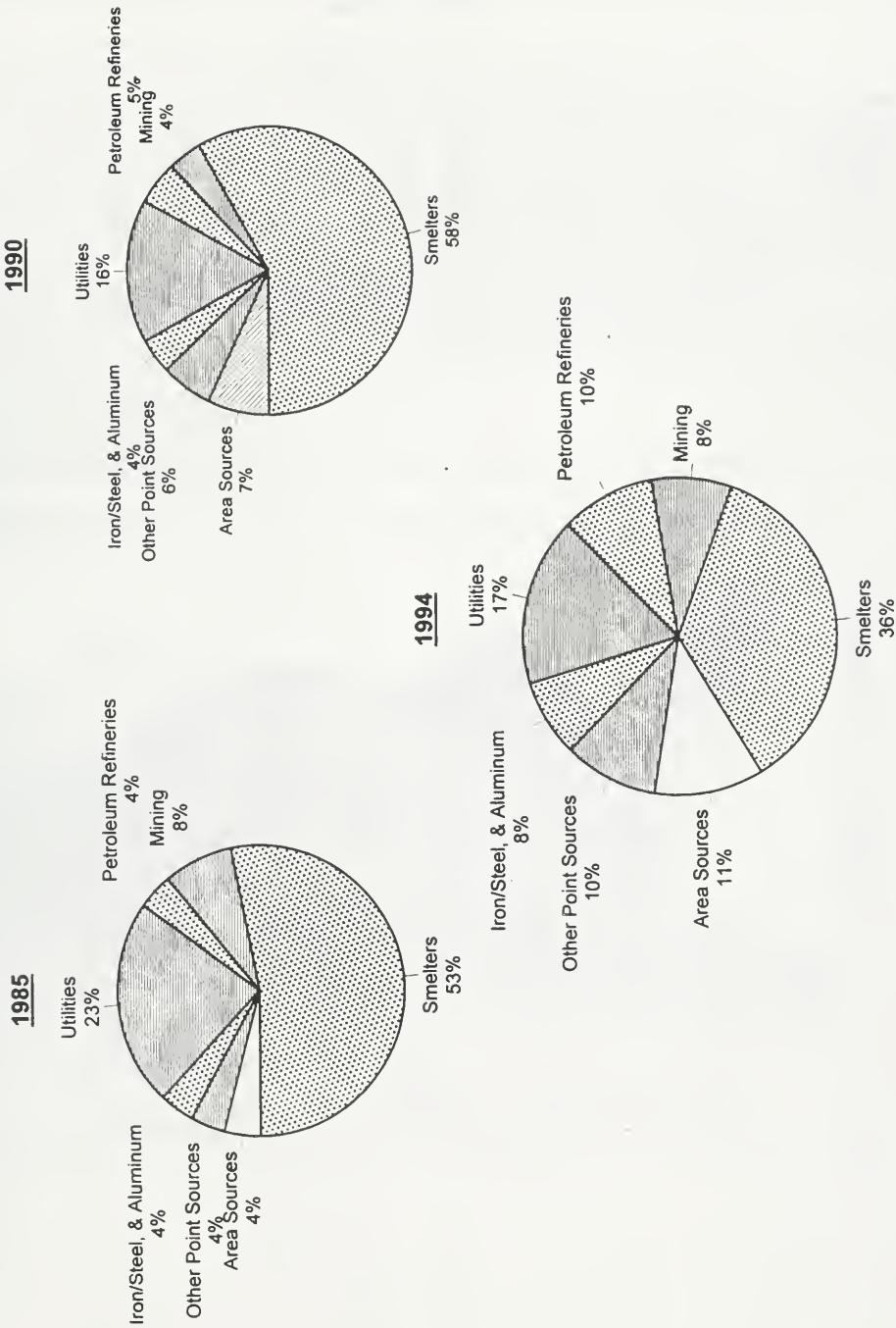


Table A-3. Impact of the Countdown Acid Rain Program on Ontario SO₂ Emission Trends*
(Thousand Tonnes)

Source	YEAR													Limit 1994	
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	
Inco	812	723	328	459	683	695	635	659	657	637	617	572	420	358	162
Falconbridge	123	114	61	79	84	74	85	65	65	68	70	64	54	57	54
Algoma (Wawa)	155	128	69	80	123	112	96	84	78	68	42	53	36	50	35
Ontario Hydro	396	417	450	437	444	337	270	332	321	305	195	166	157	95	106
Others**	272	259	232	219	233	243	257	272	286	288	268	247	246	255	262
ONTARIO TOTAL	1,758	1,642	1,140	1,274	1,567	1,461	1,343	1,411	1,407	1,366	1,192	1,102	912	816	619
															885

Note [1] * The Countdown Acid Rain Program began in 1986 and ends in 1994.

[2] The emissions of the companies in the Countdown Acid Rain Program were audited by third party.

[3] ** "Other" sources are not part of the Countdown Acid Rain Program. They are the remaining SO₂ emission sources in Ontario.

Figure A-3. Impact of the Countdown Acid Rain Program on Ontario SO₂ Emission Trends*

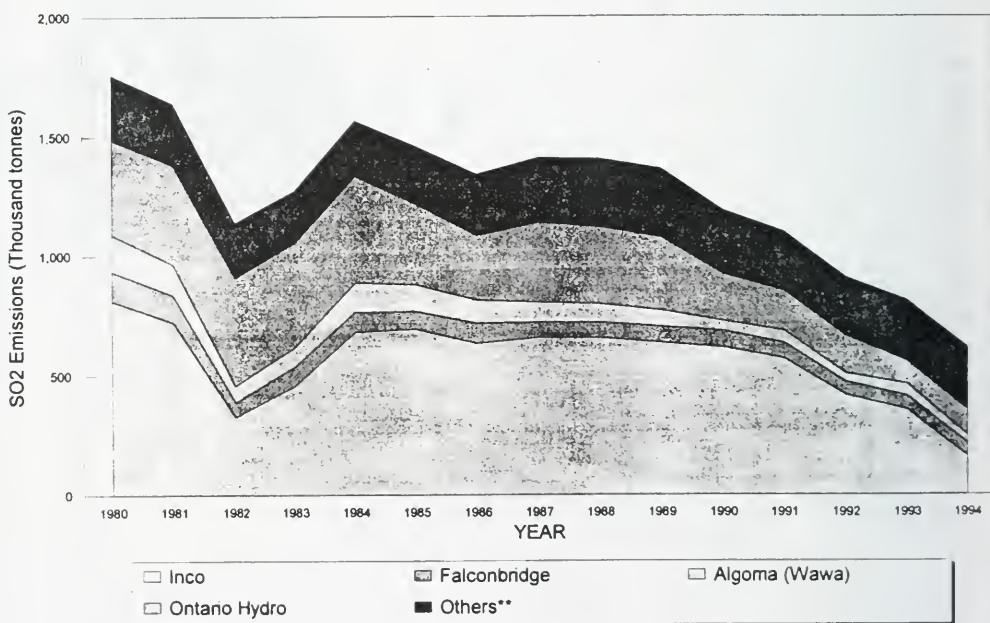


Table A-4. Ontario Hydro SO₂ Emissions Trend, 1980-1994

(Thousand Tonnes)

GENERATING STATION	YEAR														
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
ATIKOKAN						1	2	4	5	4	4	3	2	2	2
R.L. HEARN	16	6	7	1											
J.C. KEITH	1	4	6	1	1										
LAKEVIEW	75	63	67	57	56	44	27	46	48	56	36	37	30	12	8
LAMBTON	150	154	152	171	145	118	96	105	90	89	46	37	42	25	53
LENNOX	0	1	2				0	2	4	2	3	2	0	0	1
NANTICOKE	144	181	207	199	222	169	139	169	166	145	101	82	77	52	41
THUNDER BAY	10	9	9	9	10	5	6	9	10	7	6	5	5	4	4
DG/GTU *											0	0	0	0	
ONTARIO HYDRO TOTAL	396	417	450	437	444	337	270	332	321	305	195	166	157	95	106

Source of Data : Ontario Hydro Reports.

* DG/GTU : Diesel Generators/Gas Turbine Units

Figure A-4. Ontario Hydro SO₂ Emissions Trend, 1980-1994

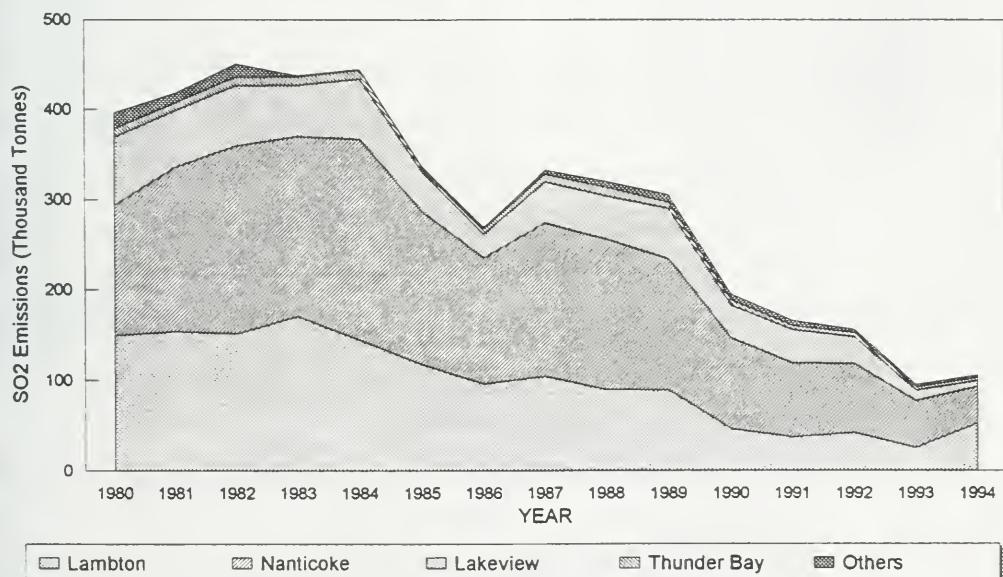


Table A-5. Ontario NOx* Emission Trend by Sector, 1985-1994

(Thousand Tonnes)

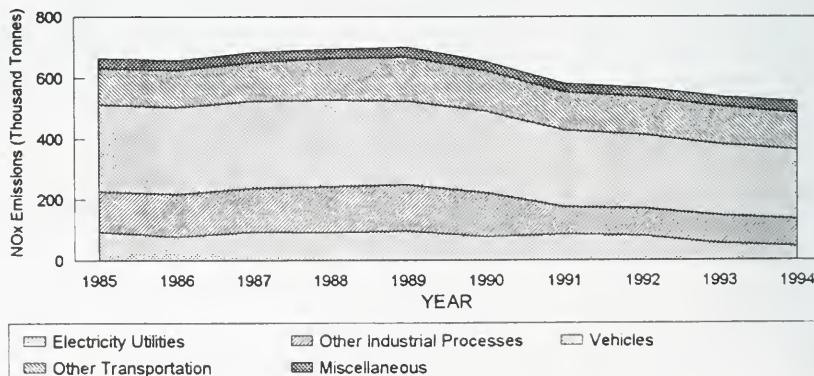
SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AREA SOURCES [1]										
Total Vehicles	287.8	286.7	285.8	285.7	275.4	270.2	251.8	243.9	234.8	228.4
Off-Highway Engines	72.7	75.1	78.6	76.5	80.3	81.6	74.0	72.6	76.9	74.0
Railroad	26.2	24.9	25.7	35.9	40.0	33.0	35.6	35.1	34.8	34.0
Aircrafts	10.1	10.2	12.0	11.6	11.6	5.5	5.7	5.7	5.7	5.7
Marine	6.5	11.5	9.8	9.7	11.6	10.5	9.7	9.2	8.2	7.0
Residential	15.8	14.1	15.6	16.4	17.4	16.1	16.2	16.6	17.9	24.2
Commercial	9.4	8.4	6.9	7.8	8.5	5.7	7.9	8.5	9.1	11.3
Industrial	4.4	4.5	6.1	5.4	5.0	7.1	3.8	4.2	4.1	3.8
Incineration	2.8	3.0	3.5	2.8	2.3	1.1	1.1	1.1	1.1	1.1
Forest Fire [2]	0.1	6.4	3.3	17.2	17.7	0.0	0.0	0.0	0.0	0.0
Other Fires [2]	0.7	0.7	0.7	0.5	0.9	0.0	0.0	0.0	0.0	0.0
Dry Cleaning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Coating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Solvent Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Marketing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Misc. Processes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUBTOTAL [6]	438.4	439.1	444.8	452.2	452.9	431.0	406.8	396.9	392.6	389.4
POINT SOURCES [3]										
Electric Utilities	94.5	77.4	94.6	92.5	96.6	77.5	86.1	80.4	55.3	45.3
Non-Iron Smelters	49.5	50.1	50.3	47.9	52.6	52.5	4.8	3.6	3.3	3.2
Other Primary Metals	22.6	25.4	25.5	25.4	24.3	21.8	20.4	22.0	20.8	20.8
Petroleum Refineries	14.4	13.5	14.4	14.6	15.2	14.4	14.0	14.3	14.7	14.5
Pulp & Paper	9.8	10.1	10.9	10.7	10.4	9.5	9.6	8.9	9.7	8.7
Chemicals	3.8	4.2	4.4	5.4	5.2	5.1	4.7	4.8	5.1	5.0
Other Manufacturing	28.3	33.1	35.5	43.4	41.4	38.7	33.2	32.9	34.4	33.5
Mining	1.1	1.1	1.1	1.2	1.1	0.1	1.2	1.1	1.2	1.3
Miscellaneous [4]	2.5	2.4	2.3	2.5	2.6	2.5	2.6	2.7	2.8	2.8
SUBTOTAL [5]	226.7	217.3	239.0	243.4	249.5	222.2	176.6	170.8	147.3	135.0
ONTARIO TOTAL [5]	665.1	656.5	683.9	695.6	702.4	653.2	582.4	567.8	639.9	524.4

* NOx expressed as NO₂

Notes:

- [1] Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- [2] Emissions from Forest Fires are for illustration only, they are not included in subtotals and totals. Information on Fires Statistics were not available from 1990 onwards.
- [3] Emission data are a combination of reported and projected emission estimates.
- [4] Includes commercial or major institutional emissions.
- [5] Components may not add up to totals due to rounding.
- [6] Zero values represent no emissions or emissions less than 50 tonnes per year.

Figure A-5a. Ontario NOx* Emission Trend by Sector, 1985-1994



**Figure A-5b. Ontario NO_x Emission Distribution by Sector
- 1985, 1990 and 1994**

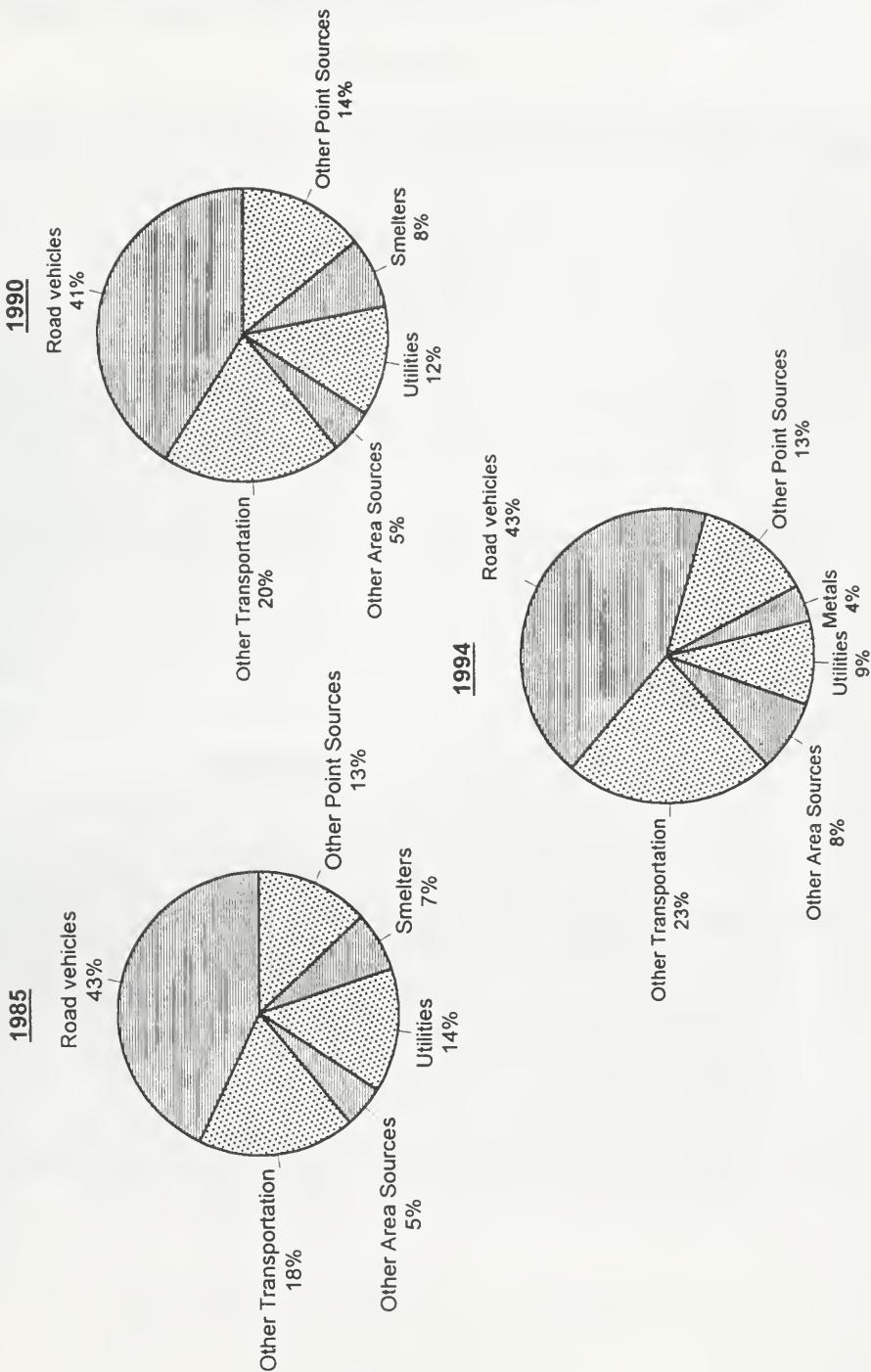


Table A-6. Ontario Hydro NOx* Emission Trend, 1980-1994

(Thousand Tonnes)

GENERATING STATION	YEAR														
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
ATIKOKAN						0	1	2	3	2	2	2	1	1	1
R.L. HEARN	5	2	2	0											
J.C. KEITH	0	1	2	0	0										
LAKEVIEW	20	18	20	20	18	14	8	14	17	21	14	15	15	6	3
LAMBTON	19	20	20	18	20	18	15	18	18	18	13	15	14	10	11
LENNOX	0	0	0				0	1	2	2	1	0	0	0	
NANTICOKE	56	64	74	75	72	60	51	55	49	48	43	48	46	34	24
THUNDER BAY	2	3	6	4	4	2	3	5	4	4	3	3	3	3	3
DG/GTU **											1	1	1	1	1
ONTARIO HYDRO TOTAL	101	109	123	118	114	94	77	95	92	96	77	86	80	55	45

Source of Data : Ontario Hydro Reports.

*NOx expressed as NO2.

** DG/GTU : Diesel Generators/Gas Turbine Units

Figure A-6. Ontario Hydro NOx* Emission Trend, 1980-1994

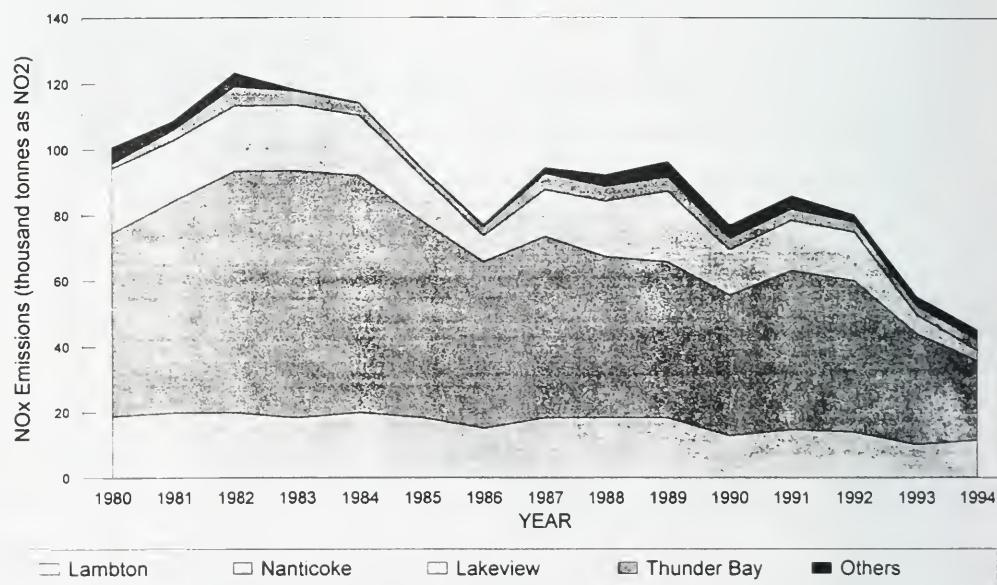


Table A-7. Ontario VOC Emission Trend by Sector, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AREA SOURCES [1]										
Total Vehicles	275.5	277.5	276.9	274.1	255.3	233.5	211.3	203.7	194.2	187.1
Off-Highway Engines	33.2	35.8	36.4	37.8	41.0	41.1	40.4	41.3	42.0	40.8
Railroad	1.4	1.2	1.2	1.7	1.9	1.6	1.7	1.7	1.7	1.7
Aircrafts	3.3	3.4	5.1	3.4	3.4	2.2	2.3	2.3	2.3	2.3
Marine	10.9	12.2	11.9	12.1	12.6	12.6	13.3	14.2	14.2	14.3
Residential	108.4	116.2	114.8	111.3	112.0	115.6	132.0	112.7	112.8	113.3
Commercial	0.3	0.3	0.3	0.3	0.3	0.0	0.3	0.3	0.3	0.4
Industrial	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0
Incineration	1.2	1.3	1.5	1.2	1.0	4.9	4.9	4.9	4.9	4.9
Forest Fire [2]	0.3	38.4	19.9	103.0	106.5	0.0	0.0	0.0	0.0	0.0
Other Fires [2]	2.6	2.7	2.7	2.3	3.9	0.0	0.0	0.0	0.0	0.0
Dry Cleaning	5.4	5.5	5.6	5.7	5.8	5.9	6.3	6.4	6.5	6.6
Surface Coating	115.0	116.4	118.4	120.4	122.2	126.8	133.7	136.0	138.1	139.8
General Solvent Use	151.9	153.7	156.3	158.9	161.4	163.3	176.6	179.5	182.3	184.3
Fuel Marketing	35.1	36.3	36.7	35.2	36.6	35.3	34.6	34.6	33.8	33.5
Misc. Processes	11.0	10.9	10.9	10.9	10.9	11.2	11.1	11.1	11.1	11.1
SUBTOTAL [5]	755.3	773.4	778.7	775.4	768.3	754.1	768.5	748.7	744.3	739.6
POINT SOURCES [3]										
Electric Utilities	0.4	0.4	0.5	0.5	0.5	0.4	0.5	0.4	0.5	0.3
Non-Iron Smelters	0.3	0.3	0.3	0.2	0.3	0.3	0.0	0.0	0.0	0.0
Other Primary Metals	29.2	30.7	30.5	30.4	29.8	25.3	24.9	25.6	25.9	25.9
Petroleum Refineries	34.9	32.8	35.0	35.4	37.0	34.9	34.0	34.7	35.7	35.2
Pulp & Paper	7.8	8.0	8.7	8.5	8.3	8.1	7.7	8.5	8.7	7.6
Chemicals	12.8	13.6	14.2	15.2	15.1	14.7	13.8	14.3	15.4	16.2
Other Manufacturing	45.9	53.1	55.0	72.4	69.0	68.7	60.9	62.6	65.0	61.5
Mining	0.7	0.6	0.6	0.7	0.6	0.5	0.8	0.6	0.6	0.7
Miscellaneous [4]	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
SUBTOTAL [5]	132.4	139.8	145.1	163.7	161.0	163.2	143.1	147.1	152.2	147.7
ONTARIO TOTAL [5]	887.7	913.2	923.8	939.1	929.3	907.3	911.6	895.8	896.6	887.4

Notes: [1] Area. Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.

[2] Emissions from Forest Fires are for illustration only, they are not included in subtotals and totals.

Information on Fires Statistics were not available from 1990 onwards.

[3] Emission data are a combination of reported and projected emission estimates.

[4] Includes commercial or major institutional emissions.

[5] Components may not add up to totals due to rounding.

[6] Zero values represent no emissions or emissions less than 50 tonnes per year.

Figure A-7a. Ontario VOC Emission Trend by Sector, 1985-1994

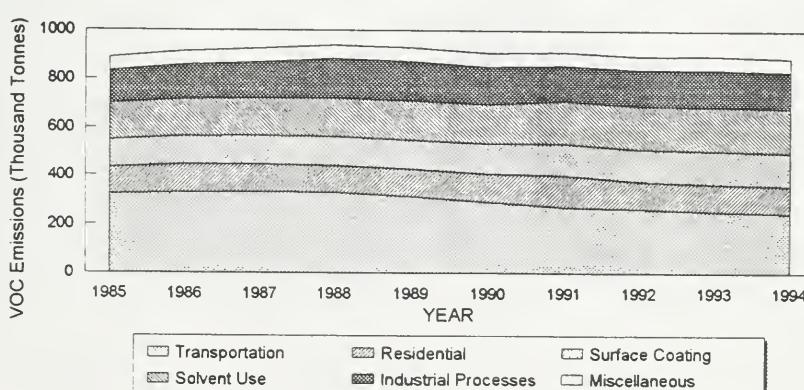


Figure A-7b.

**Ontario VOC Emission Distribution by Sector
- 1985, 1990 and 1994**

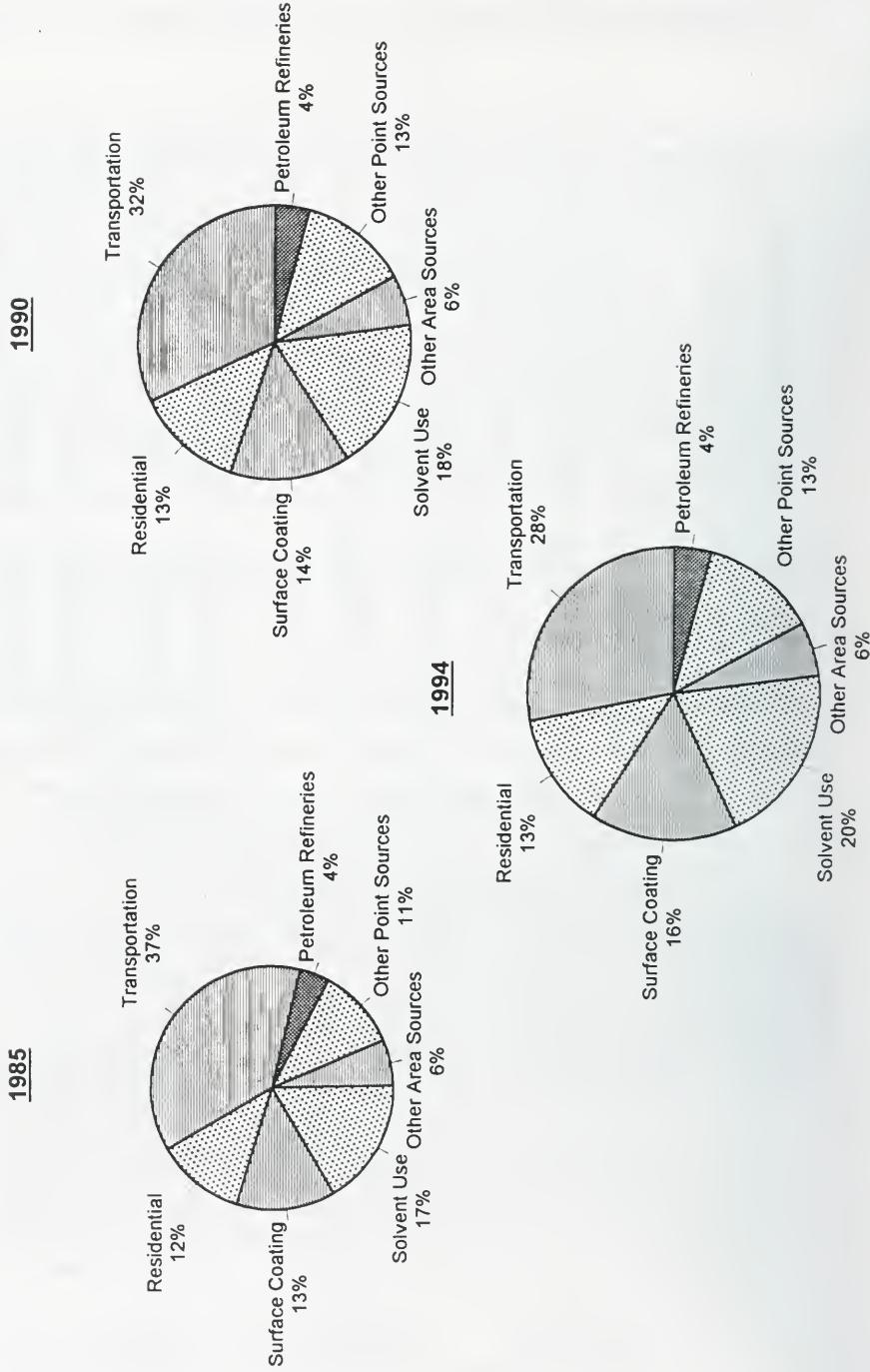


Table A-8. Ontario PM Emission Trend by Sector, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AREA SOURCES [1]										
Total Vehicles	20.7	22.9	24.0	25.2	25.8	26.4	26.9	28.0	28.6	29.3
Off-Highway Engines	6.4	6.6	7.0	7.1	7.3	7.5	7.1	7.0	7.4	7.2
Railroad	1.5	1.3	1.4	1.9	2.2	1.8	1.9	1.9	1.9	1.8
Aircrafts	0.3	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.3	0.3
Marine	1.0	1.6	1.6	1.6	1.9	1.7	1.6	1.6	1.5	1.2
Residential	27.6	29.5	29.1	28.2	28.4	29.2	33.3	28.4	28.5	28.6
Commercial	0.8	0.6	0.5	0.6	0.6	0.5	0.5	0.5	0.5	0.6
Industrial	1.1	1.6	1.8	2.0	1.8	7.5	1.3	1.5	1.3	1.1
Incineration	12.5	13.0	15.2	12.0	9.9	2.1	2.1	2.1	2.1	2.1
Forest Fire [2]	1.9	239.8	124.5	643.7	665.4	0.0	0.0	0.0	0.0	0.0
Other Fires [2]	4.2	4.7	4.5	2.9	4.8	0.0	0.0	0.0	0.0	0.0
Dry Cleaning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Coating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Solvent Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Marketing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Misc. Processes	136.7	138.1	139.4	142.4	143.6	126.8	119.8	119.5	120.8	122.8
SUBTOTAL [5]	212.6	220.4	225.1	224.4	226.8	203.8	194.8	190.7	192.8	194.9
POINT SOURCES [3]										
Electric Utilities	3.3	6.4	8.9	10.7	10.1	8.2	9.0	8.6	9.3	4.8
Non-Iron Smelters	6.9	6.5	6.6	6.5	6.4	6.2	6.2	4.1	3.6	3.8
Other Primary Metals	28.0	28.1	27.6	27.7	27.6	22.8	23.3	23.1	24.8	24.8
Petroleum Refineries	3.2	3.1	3.3	3.3	3.4	3.2	3.2	3.2	3.3	3.3
Pulp & Paper	29.9	30.7	33.3	32.8	32.1	29.9	28.3	23.3	24.4	22.2
Chemicals	12.4	13.1	13.5	14.7	14.5	14.3	13.5	13.9	14.8	15.2
Other Manufacturing	21.2	24.8	26.5	32.6	31.0	29.2	25.1	25.0	26.1	25.4
Mining	17.1	15.9	17.1	17.3	17.2	16.6	16.9	17.1	19.0	19.6
Miscellaneous [4]	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
SUBTOTAL [5]	122.6	128.8	137.2	146.0	142.7	130.9	125.9	118.8	125.9	119.5
ONTARIO TOTAL [5]	335.2	349.2	362.3	370.4	369.5	334.7	320.7	309.5	318.7	314.4

Notes: [1] Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.

[2] Emissions from Forest Fires are for illustration only, they are not included in subtotals and totals.

Information on Fires Statistics were not available from 1990 onwards.

[3] Emission data are a combination of reported and projected emission estimates.

[4] Includes commercial or major institutional emissions.

[5] Components may not add up to totals due to rounding.

[6] Zero values represent no emissions or emissions less than 50 tonnes per year.

Figure A-8. Ontario PM Emission Trend by Sector, 1985-1994

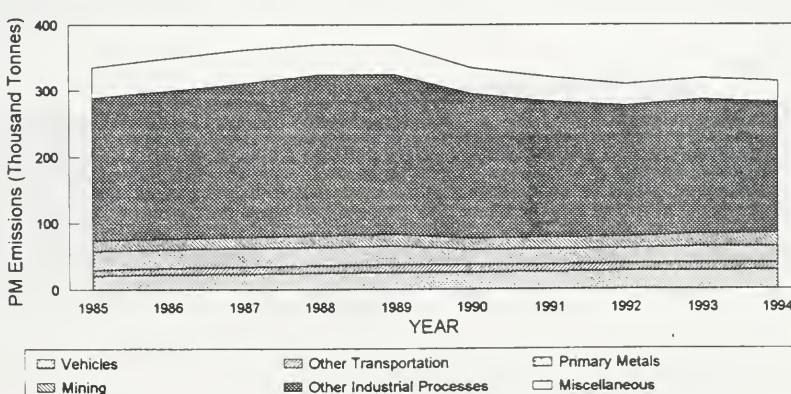


Table A-9. Ontario CO Emission Trend by Sector, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
AREA SOURCES [1]										
Total Vehicles	2,269.1	2,272.0	2,278.6	2,250.9	2,099.5	2,019.5	1,839.7	1,801.5	1,728.8	1,680.5
Off-Highway Engines	357.3	376.4	369.4	383.1	426.1	409.5	380.1	377.8	368.9	343.3
Railroad	11.3	10.0	10.3	14.3	16.0	13.2	14.2	14.0	13.9	13.6
Aircrafts	37.8	37.9	43.3	43.6	43.7	13.1	13.5	13.5	13.5	13.5
Marine	34.1	36.3	36.0	36.5	37.9	38.4	40.7	44.0	44.2	44.4
Residential	198.4	212.1	209.9	204.1	205.5	211.7	241.1	206.6	207.2	209.7
Commercial	2.0	1.8	1.5	1.7	1.8	1.0	1.7	1.8	1.8	2.3
Industrial	0.7	0.5	0.7	0.5	0.5	0.8	0.4	0.4	0.5	0.5
Incineration	47.5	49.8	58.1	46.0	37.9	47.1	47.1	47.1	47.1	47.1
Forest Fire [2]	2.0	255.8	132.8	686.6	709.8	0.0	0.0	0.0	0.0	0.0
Other Fires [2]	10.4	11.9	11.4	6.5	10.6	0.0	0.0	0.0	0.0	0.0
Dry Cleaning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surface Coating	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
General Solvent Use	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fuel Marketing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Misc. Processes	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUBTOTAL [5]	2,968.6	3,008.5	3,019.1	2,987.2	2,879.4	2,754.1	2,578.5	2,506.7	2,425.7	2,354.9
POINT SOURCES [3]										
Electric Utilities	6.9	2.8	3.6	4.0	4.1	3.4	3.5	3.2	3.9	2.0
Non-Iron Smelters	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Other Primary Metals	725.9	684.9	658.5	663.3	689.8	548.4	583.3	553.5	646.4	646.4
Petroleum Refineries	5.0	4.7	5.0	5.1	5.3	5.0	4.9	5.0	5.1	5.1
Pulp & Paper	23.1	23.6	25.7	25.2	24.7	27.8	22.2	26.9	28.7	26.2
Chemicals	59.6	63.6	66.2	70.9	70.4	68.2	64.3	66.5	71.6	75.3
Other Manufacturing	7.9	9.2	9.7	12.5	11.9	11.7	10.3	10.5	10.9	10.4
Mining	20.7	18.5	19.2	21.0	20.1	16.9	26.1	17.5	19.4	20.2
Miscellaneous [4]	2.2	2.2	2.2	2.3	2.4	2.4	2.4	2.5	2.5	2.5
SUBTOTAL [5]	851.4	809.5	790.0	804.3	828.6	683.8	717.0	685.7	788.6	788.0
ONTARIO TOTAL [5]	3,820.0	3,818.1	3,809.2	3,791.5	3,708.0	3,437.8	3,295.6	3,192.4	3,214.3	3,142.9

Notes: [1] Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.

[2] Emissions from Forest Fires are for illustration only, they are not included in subtotals and totals. Information on Fires Statistics were not available from 1990 onwards.

[3] Emission data are a combination of reported and projected emission estimates.

[4] Includes commercial or major institutional emissions.

[5] Components may not add up to totals due to rounding.

[6] Zero values represent no emissions or emissions less than 50 tonnes per year.

Figure A-9. Ontario CO Emission Trend by Sector, 1985-1994

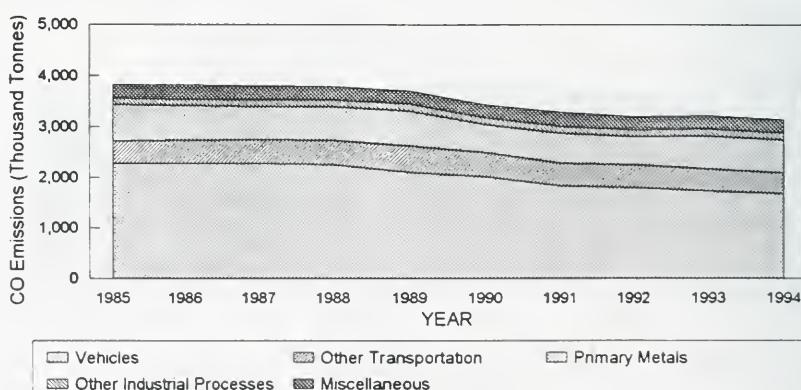


Table A-10. Ontario Standard Pollutants Emissions
- 1985
(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	16.7 (1.1)	287.8 (43.3)	275.5 (31.0)	20.7 (6.2)	2,269.1 (59.4)
Off-Highway Engines	6.2 (0.4)	72.7 (10.9)	33.2 (3.7)	6.4 (1.9)	357.3 (9.4)
Railroad (c)	2.2 (0.2)	28.2 (4.2)	1.4 (0.2)	1.5 (0.5)	11.3 (0.3)
Aircrafts (d)	0.5 (0.0)	10.1 (1.5)	3.3 (0.4)	0.3 (0.1)	37.8 (1.0)
Marine	9.8 (0.7)	6.5 (1.0)	10.9 (1.2)	1.0 (0.3)	34.1 (0.9)
Residential (e)	10.6 (0.7)	15.8 (2.4)	108.4 (12.2)	27.6 (8.2)	198.4 (5.2)
Commercial (e)	4.4 (0.3)	9.4 (1.4)	0.3 (0.0)	0.6 (0.2)	2.0 (0.1)
Industrial	6.8 (0.5)	4.4 (0.7)	0.1 (0.0)	1.1 (0.3)	0.7 (0.0)
Incineration (f)	0.7 (0.0)	2.8 (0.4)	1.2 (0.1)	12.5 (3.7)	47.5 (1.2)
Forest Fire (g)	0.0	0.1	0.3	1.9	2.0
Other Fires	0.0 (0.0)	0.7 (0.1)	2.6 (0.3)	4.2 (1.3)	10.4 (0.3)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	5.4 (0.6)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	115.0 (13.0)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	151.9 (17.1)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	35.1 (4.0)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.4 (0.0)	0.0 (0.0)	11.0 (1.2)	136.7 (40.8)	0.0 (0.0)
SUBTOTAL	58.1 (4.0)	438.4 (65.9)	755.3 (85.1)	212.6 (63.4)	2,968.6 (77.7)
POINT SOURCES					
Electric Utilities	336.7 (23.0)	94.5 (14.2)	0.4 (0.0)	3.3 (1.0)	6.9 (0.2)
Non-Iron Smelters	773.2 (52.9)	49.5 (7.4)	0.3 (0.0)	6.9 (2.1)	0.0 (0.0)
Other Primary Metals	53.9 (3.7)	22.6 (3.4)	29.2 (3.3)	28.0 (8.4)	725.9 (19.0)
Petroleum Refineries	64.0 (4.4)	14.4 (2.2)	34.9 (3.9)	3.2 (1.0)	5.0 (0.1)
Pulp & Paper	29.4 (2.0)	9.8 (1.5)	7.8 (0.9)	29.9 (8.9)	23.1 (0.6)
Chemicals	5.1 (0.4)	3.8 (0.6)	12.8 (1.4)	12.4 (3.7)	59.6 (1.6)
Other Manufacturing	27.3 (1.9)	28.3 (4.3)	45.9 (5.2)	21.2 (6.3)	7.9 (0.2)
Mining	112.6 (7.7)	1.1 (0.2)	0.7 (0.1)	17.1 (5.1)	20.7 (0.5)
Miscellaneous	0.3 (0.0)	2.5 (0.4)	0.4 (0.0)	0.4 (0.1)	2.2 (0.1)
SUBTOTAL	1,402.6 (96.0)	226.7 (34.1)	132.4 (14.9)	122.6 (36.6)	851.4 (22.3)
ONTARIO TOTAL	1,460.7 (100)	665.1 (100)	887.7 (100)	335.2 (100)	3,820.0 (100)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Forest fire emissions are for illustration only, they are not included in the subtotal and Ontario Total.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

Table A-11. Ontario Standard Pollutants Emissions

- 1986

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	17.4 (1.3)	286.7 (43.7)	277.5 (30.4)	22.9 (6.6)	2,272.0 (59.5)
Off-Highway Engines	6.4 (0.5)	75.1 (11.4)	35.8 (3.9)	6.6 (1.9)	376.4 (9.9)
Railroad (c)	1.9 (0.1)	24.9 (3.8)	1.2 (0.1)	1.3 (0.4)	10.0 (0.3)
Aircrafts (d)	0.5 (0.0)	10.2 (1.6)	3.4 (0.4)	0.3 (0.1)	37.9 (1.0)
Marine	16.0 (1.2)	11.5 (1.8)	12.2 (1.3)	1.6 (0.5)	36.3 (1.0)
Residential (e)	9.5 (0.7)	14.1 (2.1)	116.2 (12.7)	29.5 (8.4)	212.1 (5.6)
Commercial (e)	4.2 (0.3)	8.4 (1.3)	0.3 (0.0)	0.6 (0.2)	1.8 (0.0)
Industrial	9.7 (0.7)	4.5 (0.7)	0.0 (0.0)	1.6 (0.4)	0.5 (0.0)
Incineration (f)	0.7 (0.1)	3.0 (0.5)	1.3 (0.1)	13.0 (3.7)	49.8 (1.3)
Forest Fire (g)	0.0	6.4	38.4	239.8	255.8
Other Fires	0.0 (0.0)	0.7 (0.1)	2.7 (0.3)	4.7 (1.4)	11.9 (0.3)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	5.5 (0.6)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	116.4 (12.7)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	153.7 (16.8)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	36.3 (4.0)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.4 (0.0)	0.0 (0.0)	10.9 (1.2)	138.1 (39.6)	0.0 (0.0)
SUBTOTAL	66.7 (5.0)	439.1 (66.9)	773.4 (84.7)	220.4 (63.1)	3,008.5 (78.8)
POINT SOURCES					
Electric Utilities	269.8 (20.1)	77.4 (11.8)	0.4 (0.0)	6.4 (1.8)	2.8 (0.1)
Non-Iron Smelters	724.0 (53.9)	50.1 (7.6)	0.3 (0.0)	6.5 (1.9)	0.0 (0.0)
Other Primary Metals	57.2 (4.3)	25.4 (3.9)	30.7 (3.4)	28.1 (8.0)	684.9 (17.9)
Petroleum Refineries	60.1 (4.5)	13.5 (2.1)	32.8 (3.6)	3.1 (0.9)	4.7 (0.1)
Pulp & Paper	30.2 (2.2)	10.1 (1.5)	8.0 (0.9)	30.7 (8.8)	23.6 (0.6)
Chemicals	5.8 (0.4)	4.2 (0.6)	13.6 (1.5)	13.1 (3.8)	63.6 (1.7)
Other Manufacturing	32.0 (2.4)	33.1 (5.0)	53.1 (5.8)	24.8 (7.1)	9.2 (0.2)
Mining	96.5 (7.2)	1.1 (0.2)	0.6 (0.1)	15.9 (4.5)	18.5 (0.5)
Miscellaneous	0.3 (0.0)	2.4 (0.4)	0.4 (0.0)	0.4 (0.1)	2.2 (0.1)
SUBTOTAL	1,276.0 (95.0)	217.3 (33.1)	139.8 (15.3)	128.8 (36.9)	809.5 (21.2)
ONTARIO TOTAL	1,342.7 (100)	656.5 (100)	913.2 (100)	349.2 (100)	3,818.1 (100)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Forest fire emissions are for illustration only, they are not included in the subtotal and Ontario Total.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

**Table A-12. Ontario Standard Pollutants Emissions
- 1987**

(Thousands Tonnes)

SECTOR	SO ₂	(%)	NOX	(%)	VOC	(%)	PM	(%)	CO	(%)
AREA SOURCES (a)										
Total Vehicles (b)	18.3	(1.3)	285.8	(41.8)	276.9	(30.0)	24.0	(6.6)	2,278.6	(59.8)
Off-Highway Engines	6.7	(0.5)	78.6	(11.5)	36.4	(3.9)	7.0	(1.9)	369.4	(9.7)
Railroad (c)	2.0	(0.1)	25.7	(3.8)	1.2	(0.1)	1.4	(0.4)	10.3	(0.3)
Aircrafts (d)	0.7	(0.0)	12.0	(1.8)	5.1	(0.6)	0.5	(0.1)	43.3	(1.1)
Marine	18.9	(1.3)	9.8	(1.4)	11.9	(1.3)	1.6	(0.4)	36.0	(0.9)
Residential (e)	9.2	(0.7)	15.6	(2.3)	114.8	(12.4)	29.1	(8.0)	209.9	(5.5)
Commercial (e)	4.3	(0.3)	6.9	(1.0)	0.3	(0.0)	0.5	(0.1)	1.5	(0.0)
Industrial	10.2	(0.7)	6.1	(0.9)	0.1	(0.0)	1.8	(0.5)	0.7	(0.0)
Incineration (f)	0.9	(0.1)	3.5	(0.5)	1.5	(0.2)	15.2	(4.2)	58.1	(1.5)
Forest Fire (g)	0.0		3.3		19.9		124.5		132.8	
Other Fires	0.0	(0.0)	0.7	(0.1)	2.7	(0.3)	4.5	(1.2)	11.4	(0.3)
Dry Cleaning	0.0	(0.0)	0.0	(0.0)	5.6	(0.6)	0.0	(0.0)	0.0	(0.0)
Surface Coating	0.0	(0.0)	0.0	(0.0)	118.4	(12.8)	0.0	(0.0)	0.0	(0.0)
General Solvent Use	0.0	(0.0)	0.0	(0.0)	156.3	(16.9)	0.0	(0.0)	0.0	(0.0)
Fuel Marketing	0.0	(0.0)	0.0	(0.0)	36.7	(4.0)	0.0	(0.0)	0.0	(0.0)
Misc. Processes (h)	0.4	(0.0)	0.0	(0.0)	10.9	(1.2)	139.4	(38.5)	0.0	(0.0)
SUBTOTAL	71.6	(5.1)	444.8	(65.0)	778.7	(84.3)	225.1	(62.1)	3,019.1	(79.3)
POINT SOURCES										
Electric Utilities	332.5	(23.6)	94.6	(13.8)	0.5	(0.1)	8.9	(2.5)	3.6	(0.1)
Non-Iron Smelters	727.9	(51.6)	50.3	(7.4)	0.3	(0.0)	6.6	(1.8)	0.0	(0.0)
Other Primary Metals	56.5	(4.0)	25.5	(3.7)	30.5	(3.3)	27.6	(7.6)	658.5	(17.3)
Petroleum Refineries	64.2	(4.5)	14.4	(2.1)	35.0	(3.8)	3.3	(0.9)	5.0	(0.1)
Pulp & Paper	32.8	(2.3)	10.9	(1.6)	8.7	(0.9)	33.3	(9.2)	25.7	(0.7)
Chemicals	6.0	(0.4)	4.4	(0.6)	14.2	(1.5)	13.5	(3.7)	66.2	(1.7)
Other Manufacturing	34.9	(2.5)	35.5	(5.2)	55.0	(6.0)	26.5	(7.3)	9.7	(0.3)
Mining	84.6	(6.0)	1.1	(0.2)	0.6	(0.1)	17.1	(4.7)	19.2	(0.5)
Miscellaneous	0.3	(0.0)	2.3	(0.3)	0.3	(0.0)	0.4	(0.1)	2.2	(0.1)
SUBTOTAL	1,339.7	(94.9)	239.0	(35.0)	145.1	(15.7)	137.2	(37.9)	790.0	(20.7)
ONTARIO TOTAL	1,411.3	(100)	683.9	(100)	923.8	(100)	362.3	(100)	3,809.2	(100)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Forest fire emissions are for illustration only, they are not included in the subtotal and Ontario Total.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

**Table A-13. Ontario Standard Pollutants Emissions
- 1988**

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	21.4 (1.5)	285.7 (41.1)	274.1 (29.2)	25.2 (6.8)	2,250.9 (59.4)
Off-Highway Engines	7.7 (0.5)	76.5 (11.0)	37.8 (4.0)	7.1 (1.9)	383.1 (10.1)
Railroad (c)	3.3 (0.2)	35.9 (5.2)	1.7 (0.2)	1.9 (0.5)	14.3 (0.4)
Aircrafts (d)	0.7 (0.1)	11.6 (1.7)	3.4 (0.4)	0.5 (0.1)	43.6 (1.1)
Marine	18.6 (1.3)	9.7 (1.4)	12.1 (1.3)	1.6 (0.4)	36.5 (1.0)
Residential (e)	9.5 (0.7)	16.4 (2.4)	111.3 (11.9)	28.2 (7.6)	204.1 (5.4)
Commercial (e)	4.8 (0.3)	7.8 (1.1)	0.3 (0.0)	0.6 (0.2)	1.7 (0.0)
Industrial	12.0 (0.9)	5.4 (0.8)	0.0 (0.0)	2.0 (0.5)	0.5 (0.0)
Incineration (f)	0.7 (0.0)	2.8 (0.4)	1.2 (0.1)	12.0 (3.3)	46.0 (1.2)
Forest Fire (g)	0.0	17.2	103.0	643.7	686.6
Other Fires	0.0 (0.0)	0.5 (0.1)	2.3 (0.2)	2.9 (0.8)	6.5 (0.2)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	5.7 (0.6)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	120.4 (12.8)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	158.9 (16.9)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	35.2 (3.7)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.4 (0.0)	0.0 (0.0)	10.9 (1.2)	142.4 (38.4)	0.0 (0.0)
SUBTOTAL	79.0 (5.6)	452.2 (65.0)	775.4 (82.6)	224.4 (60.6)	2,987.2 (78.8)
POINT SOURCES					
Electric Utilities	320.6 (22.8)	92.5 (13.3)	0.5 (0.1)	10.7 (2.9)	4.0 (0.1)
Non-Iron Smelters	726.6 (51.6)	47.9 (6.9)	0.2 (0.0)	6.5 (1.8)	0.0 (0.0)
Other Primary Metals	56.4 (4.0)	25.4 (3.7)	30.4 (3.2)	27.7 (7.5)	663.3 (17.5)
Petroleum Refineries	64.9 (4.6)	14.6 (2.1)	35.4 (3.8)	3.3 (0.9)	5.1 (0.1)
Pulp & Paper	32.3 (2.3)	10.7 (1.5)	8.5 (0.9)	32.8 (8.9)	25.2 (0.7)
Chemicals	7.7 (0.5)	5.4 (0.8)	15.2 (1.6)	14.7 (4.0)	70.9 (1.9)
Other Manufacturing	40.5 (2.9)	43.4 (6.2)	72.4 (7.7)	32.6 (8.8)	12.5 (0.3)
Mining	78.6 (5.6)	1.2 (0.2)	0.7 (0.1)	17.3 (4.7)	21.0 (0.6)
Miscellaneous	0.3 (0.0)	2.5 (0.4)	0.4 (0.0)	0.4 (0.1)	2.3 (0.1)
SUBTOTAL	1,328.0 (94.4)	243.4 (35.0)	163.7 (17.4)	146.0 (39.4)	804.3 (21.2)
ONTARIO TOTAL	1,407.0 (100)	695.6 (100)	939.1 (100)	370.4 (100)	3,791.5 (100)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Forest fire emissions are for illustration only, they are not included in the subtotal and Ontario Total.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

**Table A-14. Ontario Standard Pollutants Emissions
- 1989**

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	21.8 (1.6)	275.4 (39.2)	255.3 (27.5)	25.8 (7.0)	2,099.5 (56.6)
Off-Highway Engines	8.0 (0.6)	80.3 (11.4)	41.0 (4.4)	7.3 (2.0)	426.1 (11.5)
Railroad (c)	3.7 (0.3)	40.0 (5.7)	1.9 (0.2)	2.2 (0.6)	16.0 (0.4)
Aircrafts (d)	0.7 (0.1)	11.6 (1.7)	3.4 (0.4)	0.5 (0.1)	43.7 (1.2)
Marine	20.5 (1.5)	11.6 (1.6)	12.6 (1.4)	1.9 (0.5)	37.9 (1.0)
Residential (e)	9.7 (0.7)	17.4 (2.5)	112.0 (12.1)	28.4 (7.7)	205.5 (5.5)
Commercial (e)	4.7 (0.3)	8.5 (1.2)	0.3 (0.0)	0.6 (0.2)	1.8 (0.0)
Industrial	10.9 (0.8)	5.0 (0.7)	0.0 (0.0)	1.8 (0.5)	0.5 (0.0)
Incineration (f)	0.6 (0.0)	2.3 (0.3)	1.0 (0.1)	9.9 (2.7)	37.9 (1.0)
Forest Fire (g)	0.0	17.7	106.5	665.4	709.8
Other Fires	0.0 (0.0)	0.9 (0.1)	3.9 (0.4)	4.8 (1.3)	10.6 (0.3)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	5.8 (0.6)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	122.2 (13.2)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	161.4 (17.4)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	36.6 (3.9)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.4 (0.0)	0.0 (0.0)	10.9 (1.2)	143.6 (38.9)	0.0 (0.0)
SUBTOTAL	80.9 (5.9)	452.9 (64.5)	768.3 (82.7)	226.8 (61.4)	2,879.4 (77.7)
POINT SOURCES					
Electric Utilities	305.5 (22.4)	96.6 (13.8)	0.5 (0.1)	10.1 (2.7)	4.1 (0.1)
Non-Iron Smelters	709.3 (51.9)	52.6 (7.5)	0.3 (0.0)	6.4 (1.7)	0.0 (0.0)
Other Primary Metals	55.8 (4.1)	24.3 (3.5)	29.8 (3.2)	27.6 (7.5)	689.8 (18.6)
Petroleum Refineries	67.7 (5.0)	15.2 (2.2)	37.0 (4.0)	3.4 (0.9)	5.3 (0.1)
Pulp & Paper	31.6 (2.3)	10.4 (1.5)	8.3 (0.9)	32.1 (8.7)	24.7 (0.7)
Chemicals	7.3 (0.5)	5.2 (0.7)	15.1 (1.6)	14.5 (3.9)	70.4 (1.9)
Other Manufacturing	38.8 (2.8)	41.4 (5.9)	69.0 (7.4)	31.0 (8.4)	11.9 (0.3)
Mining	68.6 (5.0)	1.1 (0.2)	0.6 (0.1)	17.2 (4.7)	20.1 (0.5)
Miscellaneous	0.4 (0.0)	2.6 (0.4)	0.4 (0.0)	0.4 (0.1)	2.4 (0.1)
SUBTOTAL	1,285.0 (94.1)	249.5 (35.5)	161.0 (17.3)	142.7 (38.6)	828.6 (22.3)
ONTARIO TOTAL	1,365.9 (100)	702.4 (100)	929.3 (100)	369.5 (100)	3,708.0 (100)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Forest fire emissions are for illustration only, they are not included in the subtotal and Ontario Total.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

**Table A-15. Ontario Standard Pollutants Emissions
- 1990**

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	21.3 (1.8)	270.2 (41.4)	233.5 (25.7)	26.4 (7.9)	2,019.5 (58.7)
Off-Highway Engines	7.3 (0.6)	81.6 (12.5)	41.1 (4.5)	7.5 (2.2)	409.5 (11.9)
Railroad (c)	2.7 (0.2)	33.0 (5.1)	1.6 (0.2)	1.8 (0.5)	13.2 (0.4)
Aircrafts (d)	0.4 (0.0)	5.5 (0.8)	2.2 (0.2)	0.3 (0.1)	13.1 (0.4)
Marine	19.3 (1.6)	10.5 (1.6)	12.6 (1.4)	1.7 (0.5)	38.4 (1.1)
Residential (e)	8.4 (0.7)	16.1 (2.5)	115.6 (12.7)	29.2 (8.7)	211.7 (6.2)
Commercial (e)	3.9 (0.3)	5.7 (0.9)	0.0 (0.0)	0.5 (0.1)	1.0 (0.0)
Industrial	15.3 (1.3)	7.1 (1.1)	0.1 (0.0)	7.5 (2.2)	0.6 (0.0)
Incineration (f)	0.7 (0.1)	1.1 (0.2)	4.9 (0.5)	2.1 (0.6)	47.1 (1.4)
Forest Fire (g)	0.0	0.0	0.0	0.0	0.0
Other Fires	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	5.9 (0.6)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	126.8 (14.0)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	163.3 (18.0)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	35.3 (3.9)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.4 (0.0)	0.0 (0.0)	11.2 (1.2)	126.8 (37.9)	0.0 (0.0)
SUBTOTAL	79.7 (6.7)	431.0 (66.0)	754.1 (83.1)	203.8 (60.9)	2,754.1 (80.1)
POINT SOURCES					
Electric Utilities	195.0 (16.4)	77.5 (11.9)	0.4 (0.0)	8.2 (2.5)	3.4 (0.1)
Non-Iron Smelters	691.5 (58.0)	52.5 (8.0)	0.3 (0.0)	6.2 (1.9)	0.0 (0.0)
Other Primary Metals	48.2 (4.0)	21.8 (3.3)	25.3 (2.8)	22.8 (6.8)	548.4 (16.0)
Petroleum Refineries	63.9 (5.4)	14.4 (2.2)	34.9 (3.8)	3.2 (1.0)	5.0 (0.1)
Pulp & Paper	24.4 (2.0)	9.5 (1.5)	8.1 (0.9)	29.9 (8.9)	27.8 (0.8)
Chemicals	7.3 (0.6)	5.1 (0.8)	14.7 (1.6)	14.3 (4.3)	68.2 (2.0)
Other Manufacturing	34.8 (2.9)	38.7 (5.9)	68.7 (7.6)	29.2 (8.7)	11.7 (0.3)
Mining	47.0 (3.9)	0.1 (0.0)	0.5 (0.1)	16.6 (5.0)	16.9 (0.5)
Miscellaneous	0.3 (0.0)	2.5 (0.4)	0.4 (0.0)	0.4 (0.1)	2.4 (0.1)
SUBTOTAL	1,112.3 (93.3)	222.2 (34.0)	153.2 (16.9)	130.9 (39.1)	683.8 (19.9)
ONTARIO TOTAL	1,192.1 (100.0)	653.2 (100.0)	907.3 (100.0)	334.7 (100.0)	3,437.8 (100.0)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Information on Forest Fires Statistics were not available from 1990 onwards.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

**Table A-16. Ontario Standard Pollutants Emissions
- 1991**

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	21.5 (1.9)	251.8 (43.2)	211.3 (23.2)	26.9 (8.4)	1,839.7 (55.8)
Off-Highway Engines	6.6 (0.6)	74.0 (12.7)	40.4 (4.4)	7.1 (2.2)	380.1 (11.5)
Railroad (c)	2.9 (0.3)	35.6 (6.1)	1.7 (0.2)	1.9 (0.6)	14.2 (0.4)
Aircrafts (d)	0.4 (0.0)	5.7 (1.0)	2.3 (0.3)	0.3 (0.1)	13.5 (0.4)
Marine	19.0 (1.7)	9.7 (1.7)	13.3 (1.5)	1.6 (0.5)	40.7 (1.2)
Residential (e)	7.2 (0.7)	16.2 (2.8)	132.0 (14.5)	33.3 (10.4)	241.1 (7.3)
Commercial (e)	2.7 (0.2)	7.9 (1.4)	0.3 (0.0)	0.5 (0.1)	1.7 (0.1)
Industrial	8.2 (0.7)	3.8 (0.6)	0.0 (0.0)	1.3 (0.4)	0.4 (0.0)
Incineration (f)	0.7 (0.1)	1.1 (0.2)	4.9 (0.5)	2.1 (0.6)	47.1 (1.4)
Forest Fire (g)	0.0	0.0	0.0	0.0	0.0
Other Fires	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	6.3 (0.7)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	133.7 (14.7)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	176.6 (19.4)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	34.6 (3.8)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.3 (0.0)	0.0 (0.0)	11.1 (1.2)	119.8 (37.3)	0.0 (0.0)
SUBTOTAL	69.5 (6.3)	405.8 (69.7)	768.5 (84.3)	194.8 (60.7)	2,578.5 (78.2)
POINT SOURCES					
Electric Utilities	166.5 (15.1)	86.1 (14.8)	0.5 (0.1)	9.0 (2.8)	3.5 (0.1)
Non-Iron Smelters	640.3 (58.1)	4.8 (0.8)	0.0 (0.0)	6.2 (1.9)	0.0 (0.0)
Other Primary Metals	46.7 (4.2)	20.4 (3.5)	24.9 (2.7)	23.3 (7.3)	583.3 (17.7)
Petroleum Refineries	62.3 (5.7)	14.0 (2.4)	34.0 (3.7)	3.2 (1.0)	4.9 (0.1)
Pulp & Paper	25.9 (2.3)	9.6 (1.7)	7.7 (0.8)	28.3 (8.8)	22.2 (0.7)
Chemicals	6.6 (0.6)	4.7 (0.8)	13.8 (1.5)	13.5 (4.2)	64.3 (2.0)
Other Manufacturing	29.1 (2.6)	33.2 (5.7)	60.9 (6.7)	25.1 (7.8)	10.3 (0.3)
Mining	54.6 (5.0)	1.2 (0.2)	0.8 (0.1)	16.9 (5.3)	26.1 (0.8)
Miscellaneous	0.4 (0.0)	2.6 (0.4)	0.4 (0.0)	0.4 (0.1)	2.4 (0.1)
SUBTOTAL	1,032.3 (93.7)	176.6 (30.3)	143.1 (15.7)	125.9 (39.3)	717.0 (21.8)
ONTARIO TOTAL	1,101.8 (100.0)	582.4 (100.0)	911.6 (100.0)	320.7 (100.0)	3,295.6 (100.0)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Information on Forest Fires Statistics were not available from 1990 onwards.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

Table A-17. Ontario Standard Pollutants Emissions

- 1992

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	22.3 (2.4)	243.9 (43.0)	203.7 (22.7)	28.0 (9.0)	1,801.5 (56.4)
Off-Highway Engines	6.5 (0.7)	72.6 (12.8)	41.3 (4.6)	7.0 (2.3)	377.8 (11.8)
Railroad (c)	2.8 (0.3)	35.1 (6.2)	1.7 (0.2)	1.9 (0.6)	14.0 (0.4)
Aircrafts (d)	0.4 (0.0)	5.7 (1.0)	2.3 (0.3)	0.3 (0.1)	13.5 (0.4)
Marine	19.8 (2.2)	9.2 (1.6)	14.2 (1.6)	1.6 (0.5)	44.0 (1.4)
Residential (e)	7.5 (0.8)	16.6 (2.9)	112.7 (12.6)	28.4 (9.2)	206.6 (6.5)
Commercial (e)	2.5 (0.3)	8.5 (1.5)	0.3 (0.0)	0.5 (0.2)	1.8 (0.1)
Industrial	8.9 (1.0)	4.2 (0.7)	0.0 (0.0)	1.5 (0.5)	0.4 (0.0)
Incineration (f)	0.7 (0.1)	1.1 (0.2)	4.9 (0.5)	2.1 (0.7)	47.1 (1.5)
Forest Fire (g)	0.0	0.0	0.0	0.0	0.0
Other Fires	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	6.4 (0.7)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	136.0 (15.2)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	179.5 (20.0)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	34.6 (3.9)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.3 (0.0)	0.0 (0.0)	11.1 (1.2)	119.5 (38.6)	0.0 (0.0)
SUBTOTAL	71.9 (7.9)	396.9 (69.9)	748.7 (83.6)	190.7 (61.6)	2,506.7 (78.5)
POINT SOURCES					
Electric Utilities	156.7 (17.2)	80.4 (14.2)	0.4 (0.0)	8.6 (2.8)	3.2 (0.1)
Non-Iron Smelters	478.9 (52.5)	3.6 (0.6)	0.0 (0.0)	4.1 (1.3)	0.0 (0.0)
Other Primary Metals	48.6 (5.3)	22.0 (3.9)	25.6 (2.9)	23.1 (7.4)	553.5 (17.3)
Petroleum Refineries	63.7 (7.0)	14.3 (2.5)	34.7 (3.9)	3.2 (1.0)	5.0 (0.2)
Pulp & Paper	20.8 (2.3)	8.9 (1.6)	8.5 (1.0)	23.3 (7.5)	26.9 (0.8)
Chemicals	6.8 (0.7)	4.8 (0.8)	14.3 (1.6)	13.9 (4.5)	66.5 (2.1)
Other Manufacturing	28.1 (3.1)	32.9 (5.8)	62.6 (7.0)	25.0 (8.1)	10.5 (0.3)
Mining	36.6 (4.0)	1.1 (0.2)	0.6 (0.1)	17.1 (5.5)	17.5 (0.5)
Miscellaneous	0.4 (0.0)	2.7 (0.5)	0.4 (0.0)	0.4 (0.1)	2.5 (0.1)
SUBTOTAL	840.5 (92.1)	170.8 (30.1)	147.1 (16.4)	118.8 (38.4)	685.7 (21.5)
ONTARIO TOTAL	912.4 (100.0)	567.8 (100.0)	895.8 (100.0)	309.5 (100.0)	3,192.4 (100.0)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Information on Forest Fires Statistics were not available from 1990 onwards.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

**Table A-18. Ontario Standard Pollutants Emissions
- 1993**

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	22.9 (2.8)	234.8 (43.5)	194.2 (21.7)	28.6 (9.0)	1,728.6 (53.8)
Off-Highway Engines	7.0 (0.9)	76.9 (14.2)	42.0 (4.7)	7.4 (2.3)	368.9 (11.5)
Railroad (c)	2.8 (0.3)	34.8 (6.4)	1.7 (0.2)	1.9 (0.6)	13.9 (0.4)
Aircrafts (d)	0.4 (0.1)	5.7 (1.1)	2.3 (0.3)	0.3 (0.1)	13.5 (0.4)
Marine	18.9 (2.3)	8.2 (1.5)	14.2 (1.6)	1.5 (0.5)	44.2 (1.4)
Residential (e)	8.0 (1.0)	17.9 (3.3)	112.8 (12.6)	28.5 (8.9)	207.2 (6.4)
Commercial (e)	3.0 (0.4)	9.1 (1.7)	0.3 (0.0)	0.5 (0.2)	1.8 (0.1)
Industrial	7.7 (0.9)	4.1 (0.8)	0.0 (0.0)	1.3 (0.4)	0.5 (0.0)
Incineration (f)	0.7 (0.1)	1.1 (0.2)	4.9 (0.5)	2.1 (0.6)	47.1 (1.5)
Forest Fire (g)	0.0	0.0	0.0	0.0	0.0
Other Fires	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	6.5 (0.7)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	138.1 (15.4)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	182.3 (20.3)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	33.8 (3.8)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.3 (0.0)	0.0 (0.0)	11.1 (1.2)	120.8 (37.9)	0.0 (0.0)
SUBTOTAL	72.0 (8.8)	392.6 (72.7)	744.3 (83.0)	192.8 (60.5)	2,425.7 (75.5)
POINT SOURCES					
Electric Utilities	95.3 (11.7)	55.3 (10.2)	0.5 (0.1)	9.3 (2.9)	3.9 (0.1)
Non-Iron Smelters	420.6 (51.6)	3.3 (0.6)	0.0 (0.0)	3.6 (1.1)	0.0 (0.0)
Other Primary Metals	49.2 (6.0)	20.8 (3.8)	25.9 (2.9)	24.8 (7.8)	646.4 (20.1)
Petroleum Refineries	65.5 (8.0)	14.7 (2.7)	35.7 (4.0)	3.3 (1.0)	5.1 (0.2)
Pulp & Paper	21.7 (2.7)	9.7 (1.8)	8.7 (1.0)	24.4 (7.7)	28.7 (0.9)
Chemicals	7.1 (0.9)	5.1 (0.9)	15.4 (1.7)	14.8 (4.6)	71.6 (2.2)
Other Manufacturing	29.4 (3.6)	34.4 (6.4)	65.0 (7.2)	26.1 (8.2)	10.9 (0.3)
Mining	54.6 (6.7)	1.2 (0.2)	0.6 (0.1)	19.0 (6.0)	19.4 (0.6)
Miscellaneous	0.4 (0.0)	2.8 (0.5)	0.4 (0.0)	0.4 (0.1)	2.5 (0.1)
SUBTOTAL	743.9 (91.2)	147.3 (27.3)	152.2 (17.0)	125.9 (39.5)	788.6 (24.5)
ONTARIO TOTAL	815.8 (100.0)	539.9 (100.0)	896.6 (100.0)	318.7 (100.0)	3,214.3 (100.0)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Information on Forest Fires Statistics were not available from 1990 onwards.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

**Table A-19. Ontario Standard Pollutants Emissions
- 1994**

(Thousand Tonnes)

SECTOR	SO2 (%)	NOX (%)	VOC (%)	PM (%)	CO (%)
AREA SOURCES (a)					
Total Vehicles (b)	23.6 (3.8)	228.4 (43.5)	187.1 (21.1)	29.3 (9.3)	1,680.5 (53.5)
Off-Highway Engines	6.8 (1.1)	74.0 (14.1)	40.8 (4.6)	7.2 (2.3)	343.3 (10.9)
Railroad (c)	2.7 (0.4)	34.0 (6.5)	1.7 (0.2)	1.8 (0.6)	13.6 (0.4)
Aircrafts (d)	0.4 (0.1)	5.7 (1.1)	2.3 (0.3)	0.3 (0.1)	13.5 (0.4)
Marine	15.2 (2.5)	7.0 (1.3)	14.3 (1.6)	1.2 (0.4)	44.4 (1.4)
Residential (e)	10.9 (1.8)	24.2 (4.6)	113.3 (12.8)	28.6 (9.1)	209.7 (6.7)
Commercial (e)	3.4 (0.6)	11.3 (2.1)	0.4 (0.0)	0.6 (0.2)	2.3 (0.1)
Industrial	5.9 (1.0)	3.8 (0.7)	0.0 (0.0)	1.1 (0.3)	0.5 (0.0)
Incineration (f)	0.7 (0.1)	1.1 (0.2)	4.9 (0.5)	2.1 (0.7)	47.1 (1.5)
Forest Fire (g)	0.0	0.0	0.0	0.0	0.0
Other Fires	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)	0.0 (0.0)
Dry Cleaning	0.0 (0.0)	0.0 (0.0)	6.6 (0.7)	0.0 (0.0)	0.0 (0.0)
Surface Coating	0.0 (0.0)	0.0 (0.0)	139.6 (15.7)	0.0 (0.0)	0.0 (0.0)
General Solvent Use	0.0 (0.0)	0.0 (0.0)	184.3 (20.8)	0.0 (0.0)	0.0 (0.0)
Fuel Marketing	0.0 (0.0)	0.0 (0.0)	33.5 (3.8)	0.0 (0.0)	0.0 (0.0)
Misc. Processes (h)	0.3 (0.1)	0.0 (0.0)	11.1 (1.2)	122.8 (39.1)	0.0 (0.0)
SUBTOTAL	70.0 (11.3)	389.4 (74.3)	739.6 (83.4)	194.9 (62.0)	2,354.9 (74.9)
POINT SOURCES					
Electric Utilities	106.2 (17.2)	45.3 (8.6)	0.3 (0.0)	4.8 (1.5)	2.0 (0.1)
Non-Iron Smelters	221.5 (35.8)	3.2 (0.6)	0.0 (0.0)	3.8 (1.2)	0.0 (0.0)
Other Primary Metals	49.2 (8.0)	20.8 (4.0)	25.9 (2.9)	24.8 (7.9)	646.4 (20.6)
Petroleum Refineries	64.5 (10.4)	14.5 (2.8)	35.2 (4.0)	3.3 (1.0)	5.1 (0.2)
Pulp & Paper	18.7 (3.0)	8.7 (1.7)	7.6 (0.9)	22.2 (7.0)	26.2 (0.8)
Chemicals	6.8 (1.1)	5.0 (0.9)	16.2 (1.8)	15.2 (4.8)	75.3 (2.4)
Other Manufacturing	29.4 (4.8)	33.5 (6.4)	61.5 (6.9)	25.4 (8.1)	10.4 (0.3)
Mining	51.7 (8.4)	1.3 (0.2)	0.7 (0.1)	19.6 (6.2)	20.2 (0.6)
Miscellaneous	0.4 (0.1)	2.8 (0.5)	0.4 (0.0)	0.4 (0.1)	2.5 (0.1)
SUBTOTAL	548.5 (88.7)	135.0 (25.7)	147.7 (16.6)	119.5 (38.0)	788.0 (25.1)
ONTARIO TOTAL	618.5 (100.0)	524.4 (100.0)	887.4 (100.0)	314.4 (100.0)	3,142.9 (100.0)

Notes :

- (a) Area: Anthropogenic sources, excludes forest fires, landfills, natural, fugitive and other open sources.
- (b) Updated transportation: NOx, VOC & CO (C&P) factors from MOBILE 5C in July 1994.
- (c) New C&P factors suggested by RAC.
- (d) Includes aircrafts in-flight emissions.
- (e) Adjusted for point sources emissions.
- (f) Adjusted VOC emission from C&P 1985 information in December, 1991.
- (g) Information on Forest Fires Statistics were not available from 1990 onwards.
- (h) Includes evaporation processes, industrial processes (area source)
- (i) Zero values represent no emissions or emissions less than 50 tonnes per year.

Table A-20. Ontario 1985 Top 10 SO₂ Point Sources

Rank	Company Name	City	SO ₂ Emission (Thousand tonnes)	% of Ontario
1	Inco Ltd. (Copper Cliff)	Copper Cliff *	695	47.6%
2	Nanticoke TGS	Nanticoke	169	11.6%
3	Lambton TGS	Courtright	118	8.1%
4	Algoma - Ore Division	Wawa	112	7.7%
5	Falconbridge Limited	Falconbridge *	74	5.1%
6	Lakeview TGS	Mississauga	44	3.0%
7	Esso Petroleum	Sarnia	22	1.5%
8	Dofasco Inc.	Hamilton	20	1.4%
9	Stelco (Hilton) Works	Hamilton	17	1.2%
10	Shell Canada	Corunna *	13	0.9%
TOTAL OF 10 MAJOR SOURCES:				1,284
Ontario Provincial Total = 1461 thousand tonnes.				87.9%

* Copper Cliff and Falconbridge are outside Sudbury, and Corunna is outside Sarnia.

Figure A-10. Ontario 1985 Top 10 SO₂ Point Sources

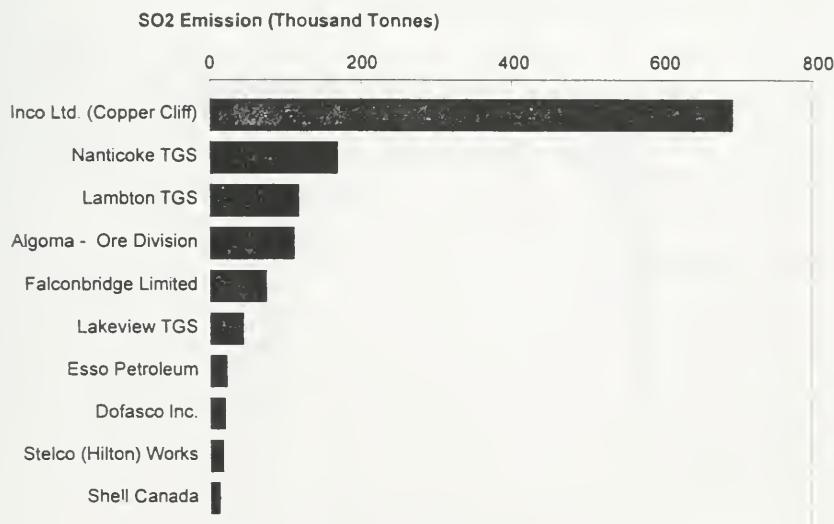


Table A-21. Ontario 1990 Top 10 SO₂ Point Sources

Rank	Company Name	City	SO ₂ Emission (Thousand tonnes)	% of Ontario
1	Inco Ltd. (Copper Cliff)	Copper Cliff *	617	51.8%
2	Nanticoke TGS	Nanticoke	101	8.5%
3	Falconbridge Limited	Falconbridge *	70	5.8%
4	Lambton TGS	Courtright	46	3.9%
5	Algoma - Ore Division	Wawa	42	3.6%
6	Lakeview TGS	Mississauga	36	3.0%
7	Esso Petroleum	Sarnia	23	1.9%
8	Dofasco Inc.	Hamilton	20	1.7%
9	Shell Canada Ltd.	Corunna *	14	1.2%
10	Algoma Steel Inc.	Sault Ste. Marie	11	0.9%
TOTAL OF 10 MAJOR SOURCES:				981
Ontario Provincial Total = 1192 thousand tonnes.				82.3%

* Copper Cliff and Falconbridge are outside Sudbury, and Corunna is outside Sarnia.

Figure A-11. Ontario 1990 Top 10 SO₂ Point Sources

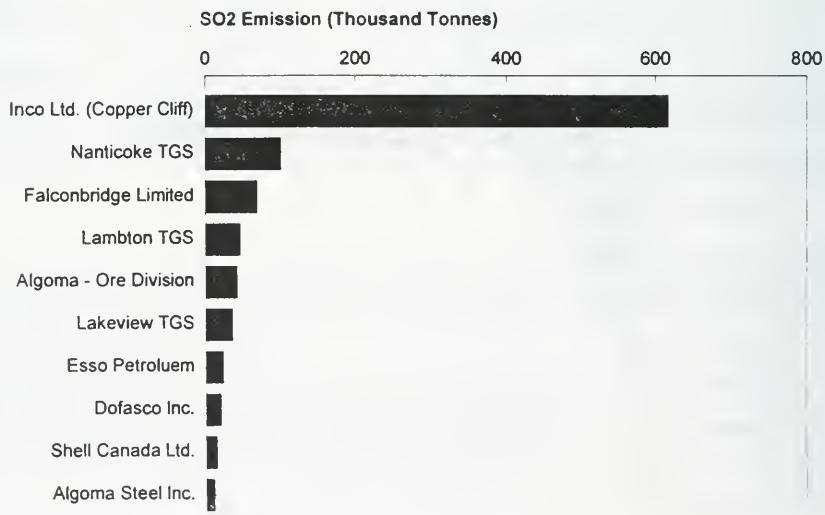


Table A-22. Ontario 1985 Top 10 NOx Point Sources

Rank	Company Name	City	NOx Emission (Thousand tonnes)	% of Ontario
1	NanticokeTGS	Nanticoke	60	9.0%
2	Inco Ltd. (Copper Cliff)	Copper Cliff *	49	7.3%
3	Lambton TGS	Courttright	18	2.8%
4	Lakeview TGS	Mississauga	14	2.1%
5	Stelco (Hilton) Works	Hamilton	8	1.1%
6	Dofasco Inc.	Hamilton	7	1.1%
7	Esso Chemicals	Samia	4	0.6%
8	Esso Petroleum	Samia	4	0.6%
9	Stelco (Lake Erie)	Nanticoke	3	0.5%
10	St. Lawrence Cement	Mississauga	3	0.5%
TOTAL OF 10 MAJOR SOURCES:			170	25.5%
Ontario Provincial Total = 665 thousand tonnes.				

*Copper Cliff is outside Sudbury.

Figure A-12. Ontario 1985 Top 10 NOx Point Sources

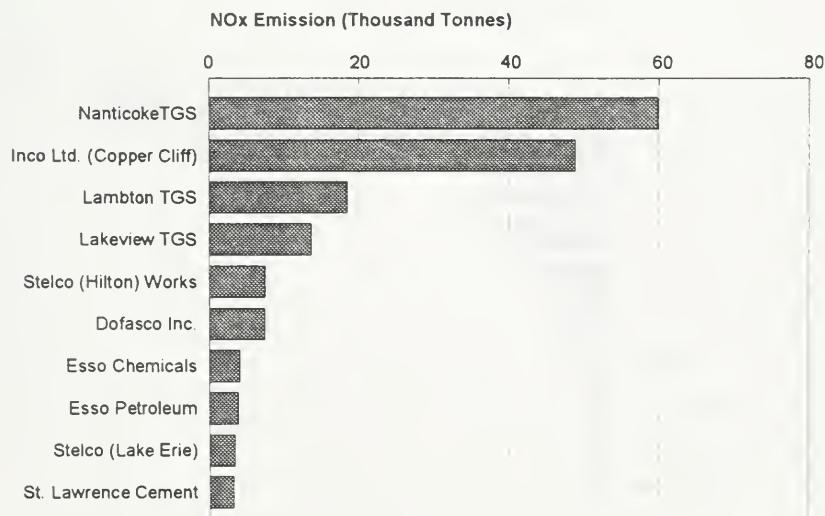


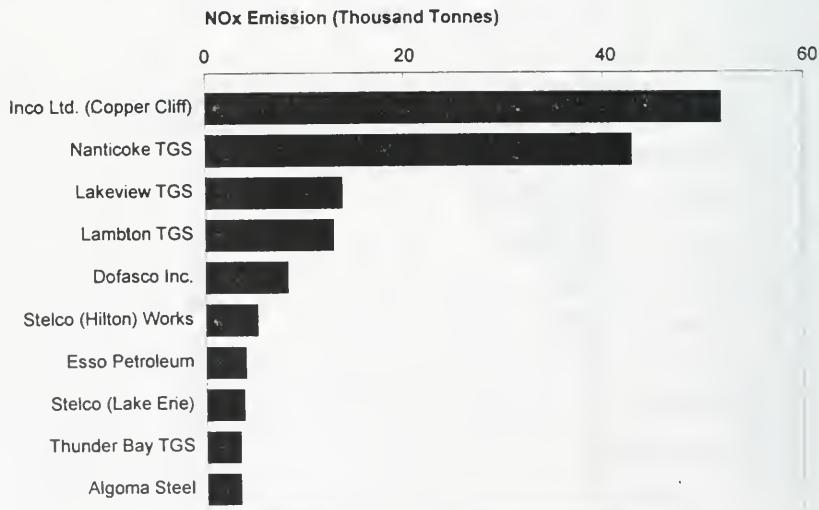
Table A-23. Ontario 1990 Top 10 NOx Point Sources

Rank	Company Name	City	NOx Emission (Thousand tonnes)	% of Ontario
1	Inco Ltd. (Copper Cliff)	Copper Cliff *	52	7.9%
2	Nanticoke TGS	Nanticoke	43	6.6%
3	Lakeview TGS	Mississauga	14	2.1%
4	Lambton TGS	Courtright	13	2.0%
5	Dofasco Inc.	Hamilton	8	1.3%
6	Stelco (Hilton) Works	Hamilton	5	0.8%
7	Esso Petroleum	Sarnia	4	0.6%
8	Stelco (Lake Erie)	Nanticoke	4	0.6%
9	Thunder Bay TGS	Thunder Bay	3	0.5%
10	Algoma Steel	Sault Ste. Marie	3	0.5%
TOTAL OF 10 MAJOR SOURCES:			149.5	22.9%
Ontario Provincial Total = 653 thousand tonnes.				

* Copper Cliff is outside Sudbury.

1990 was the last year in which INCO's NOx emissions were so high. They have been much lower from 1991 onwards.

Figure A-13. Ontario 1990 Top 10 NOx Point Sources



Other Emissions

Table A-24. ONTARIO 1985 AMMONIA EMISSION BY SOURCES

SOURCE	AMMONIA EMISSIONS (Tonnes)	% OF ONTARIO
Natural Sources:		
Soils	52,954	46.5
Amimal Waste	10,418	9.2
Forest Fires	3	0.0
Human Breath	50	0.0
Subtotal:	63,425	55.7
Anthropogenic Area Sources:		
Combustion	537	0.5
Incineration	37	0.0
Livestock Management	33,208	29.2
Fertilizer Application	1,705	1.5
Cigarette Smoking	2	0.0
Subtotal:	35,489	31.2
Anthropogenic Point Sources:		
Industrial	14,781	13.0
Incineration	78	0.1
Subtotal:	14,859	13.1
ONTARIO TOTAL:	113,773	100.0%

Source: Report by The Environmental Applications Group Limited,
 "Alkaline Dust and Ammonia Emissions Inventory for Ontario",
 March 1988.

Figure A-14. Ontario 1985 Ammonia Emission Distribution by Sector

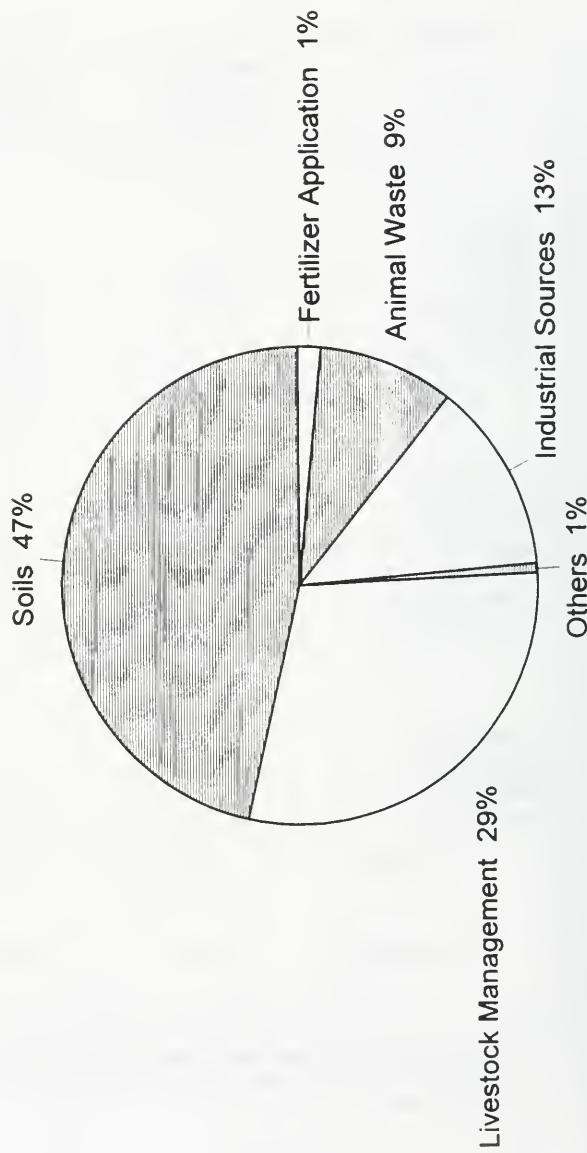


Table A-25. ONTARIO 1985 ALKALINE DUST EMISSION BY SOURCES

SOURCE	ALKALINE DUST EMISSIONS (Tonnes)	% OF ONTARIO
Natural Sources:		
Soils	60,789	3.9
Forest Fires	2	0.0
Subtotal:	60,791	3.9
Anthropogenic Area Sources:		
Combustion	1,214	0.1
Transportation	118	0.0
Open Sources*	1,466,491	93.2
Open Burning	<1	0.0
Subtotal:	1,467,823	93.3
Anthropogenic Point Sources:		
Industrial	43,090	2.7
Combustion	<1	0.0
Incineration	1,037	0.1
Subtotal:	44,127	2.8
TOTAL:	1,572,741	100.0

* Open Sources: includes paved and unpaved roads.

Source: Report by The Environmental Applications Group Limited,
"Alkaline Dust and Ammonia Emissions Inventory for Ontario",
March 1988.

Figure A-15. Ontario 1985 Alkaline Dust Emission distribution by Sector

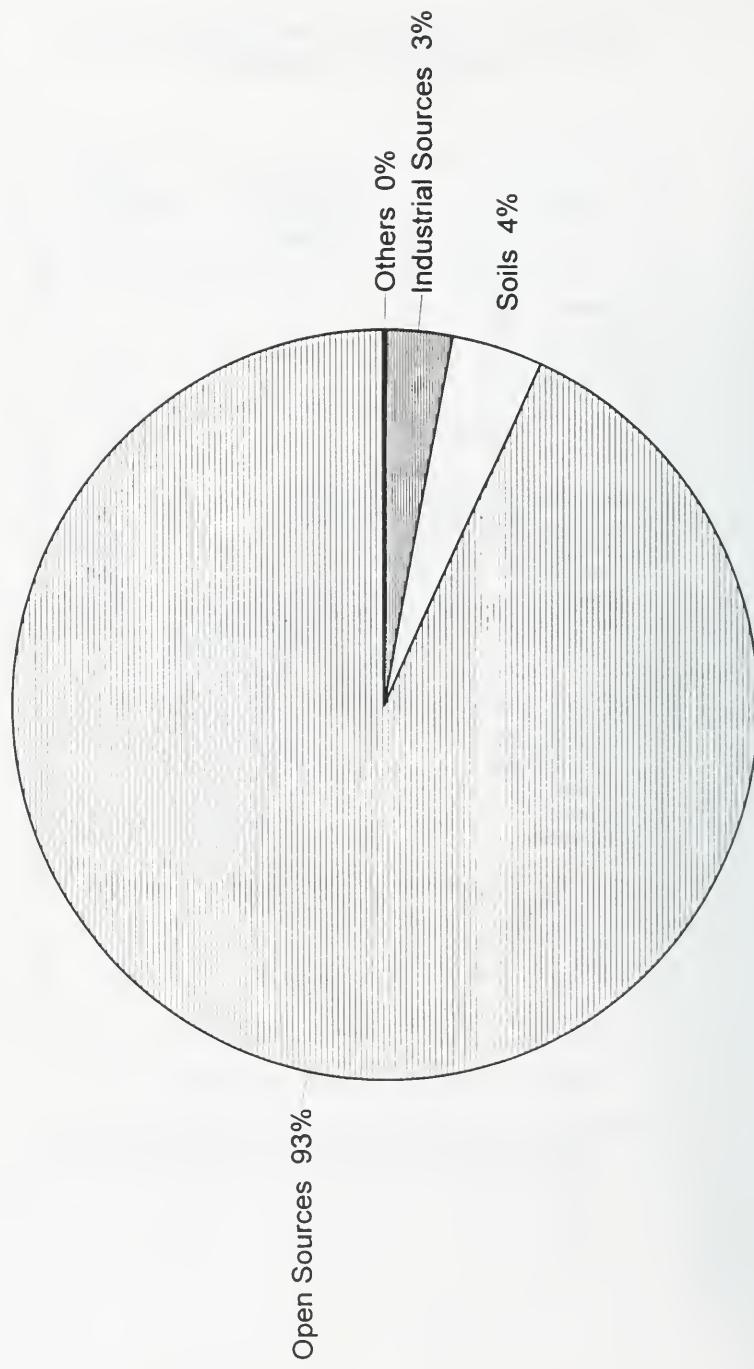


TABLE A-26. ONTARIO 1990 CO₂ EMISSIONS BY SECTOR AND FUEL TYPE
(Thousand Tonnes)

SECTOR	Oil Products	FUEL TYPE*	SECTOR TOTALS
	Nat. Gas	NGLs	Coal
FUEL COMBUSTION			
RESIDENTIAL			
Single Family ^a	11,267	150	0
Apartments	1,267	18	0
Total Residential:	12,534	168	0
COMMERCIAL/INSTITUTIONAL			
Schools/Universities ^b	102	735	30
Colleges	44	209	12
Hospitals/Health Bldgs	15	293	12
Retail Stores	29	641	30
Offices	190	929	30
Hotels/Restaurants	15	631	30
Warehouses	7	625	30
Recreation	37	229	6
Other Buildings	870	2,906	120
Total Commercial:	1,309	7,397	299
INDUSTRIAL			
Agriculture	1,436	432	138
Construction	488	0	60
Chemicals	496	2,176	0
Iron and Steel	1,073	1,938	0
Mining, Milling & Smelting	548	696	72
Cement	392	85	0
Pulp and Paper ^c	383	2,231	0
Other ^d	1,103	9,245	371
Total Industrial:	6,297	16,732	640

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SECTOR	Oil Products	FUEL TYPE*	SECTOR TOTALS
	Nat. Gas	NGLs	Coal
FUEL COMBUSTION (cont'd.)			
TRANSPORTATION			
Motor Gasoline	28,756	0	0
Diesel	9,564	0	0
Aviation Turbo	3,920	0	0
Aviation Gas	104	0	0
Heavy Fuel Oil	984	0	0
Natural Gas	0	40	0
Natural Gas Liquids	0	0	0
Total Transportation:	43,028	40	0
ELECTRICITY GENERATION ^e			
OWN USE	1,045	417	0
Petroleum Refining	4,332	1,058	60
Pipelines	10	2,181	0
Electricity	60	0	0
Total Own Use:	4,402	3,239	0
Total Fuel Combustion:			
	60,058	40,410	1,813
			38,087
			140,362
INDUSTRIAL PROCESSES			
Cement Production	N/A	N/A	N/A
Lime Production	N/A	N/A	N/A
Stripped Natural Gas	N/A	N/A	N/A
Non-Energy Use ^f	—	—	—
Total Industrial Processes:	37,224	37,224	0

table continued to right ...

TOTAL CO₂ EMISSIONS: 147,823

*N/A = not applicable.

** = not available

^a Nat. Gas = natural gas, ^b NGLs = natural gas liquids (such as propane and butane).

^c Where a total differs from the sum of the individual amounts by one or two kilotonnes, it is due to rounding.

^d CO₂ emissions from burning of woodwaste are not included. The following sectors had CO₂ emissions from woodwaste fuel combustion: RESIDENTIAL, Single Family, 2,420 kt, INDUSTRIAL, Pulp and Paper, 6,284 kt, ELECTRICITY GENERATION, 301 kt. According to the OECD, CO₂ emissions from woodwaste (biomass) burning are not included in estimates of anthropogenic CO₂ emissions.

^e Other industrial sectors include Auto Production, Food and Beverages, Iron Foundries and Non-Metallic Minerals, and may include some other sectors not listed in this table. ^f "Non-energy use" means that the CO₂ emissions do not result from fuel combustion, but rather, from the use of fuels as raw materials in industrial processes.

SOURCES:

- Fuel Combustion emissions: Ontario MOEE, Policy Division, Economic Services Branch, June 1984.

- Industrial Processes emissions: Environment Canada report, "Canada's Greenhouse Gas Emissions: Estimates for 1990", report EPS 5/AP/4, December 1992.

TABLE A-27. ONTARIO 1992 CO₂ EMISSIONS BY SECTOR AND FUEL TYPE
(Thousand Tonnes)

SECTOR	FUEL TYPE*										Total Coal Gas Lignite	SECTOR TOTALS
	LFO	HFO	Kero. Sene.	Diesel Fuel	Oil Products Motor Gas	Aviat. Turbo Gas	Petrol. Coke	Total Oil Products	Natural Gas	Cdn. Bitum.		
FUEL COMBUSTION												
RESIDENTIAL												
Single Family Apartments	—	—	—	0	0	0	0	—	—	0	0	0
Total Residential ^a	3,129	22	203	0	0	0	0	3,354	14,040	287	0	0
COMMERCIAL/INSTITUTIONAL												
Schools/Universities& Colleges	—	—	—	0	0	0	0	—	—	0	0	0
Railways	—	—	—	0	0	0	0	—	—	0	0	0
Hospitals/Health Bldgs	—	—	—	0	0	0	0	—	—	0	0	0
Retail Stores	—	—	—	0	0	0	0	—	—	0	0	0
Offices	—	—	—	0	0	0	0	—	—	0	0	0
Hotels/Restaurants	—	—	—	0	0	0	0	—	—	0	0	0
Warehouses	—	—	—	0	0	0	0	—	—	0	0	0
Recreation	—	—	—	0	0	0	0	—	—	0	0	0
Other Buildings	0	0	0	0	0	0	0	—	—	0	0	0
Streetlighting	—	—	—	0	0	0	0	—	—	0	0	0
Total Commercial ^a	877	59	74	0	0	0	0	0	1,011	8,619	305	0
INDUSTRIAL												
Agriculture	0	22	20	714	449	0	0	1,205	467	156	0	0
Forestry	0	7	0	99	0	0	0	106	0	0	0	0
Construction	51	0	7	516	0	0	0	574	0	215	0	0
Chemicals	0	252	0	7	0	0	0	259	1,744	0	0	0
Iron and Steel	0	622	0	71	0	0	0	692	2,757	0	0	0
Mining, Milling & Smelting	7	111	0	280	0	0	0	408	1,083	138	0	0
Cement	0	67	0	0	0	0	0	197	84	0	1,077	0
Pulp and Paper ^b	0	237	0	57	0	0	0	293	2,141	0	0	41
Other ^a	37	244	0	361	0	0	0	390	7,621	180	0	49
Total Industrial ^a	95	1,561	27	2,114	449	0	0	521	4,766	688	0	12,036
TRANSPORTATION	0	969	0	9,091	26,436	3,237	42	0	41,775	45	694	0
												42,514
												17,861

table continued on next page....

TABLE A-27 (cont'd). ONTARIO 1992 CO₂ EMISSIONS BY SECTOR AND FUEL TYPE
 (Thousand Tonnes)

... table continued from previous page.

SECTOR	FUEL TYPE*										FUEL TYPE*				FUEL TYPE*				SECTOR TOTAL\$			
	LFO	HFO	Kero-	Diesel	OIL PRODUCTS			Petrol	COAL			Cdn.	U.S.	Brum.	Light*	Total	Cdn.	Brum.	Light*	Total		
FUEL COMBUSTION (cont'd)	—	—	0	—	0	0	0	Aviat.	Aviat.	Turbo	Gas	Petrol	Total Oil	Products	Natural	Gas	NGLs	Cdn.	Brum.	Light*	Total	Cdn.
ELECTRICITY GENERATION*	—	—	0	—	0	0	0	0	0	0	0	826	1,148	0	7,832	17,043	1,304	26,176	26,152	26,152		
OWN USE	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Petroleum Refining	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Pipelines	0	0	0	0	0	0	0	0	0	0	0	4,869	1,143	0	0	0	0	0	0	0	6,011	
Electricity	0	0	0	0	0	0	0	0	0	0	0	0	10	3,125	0	0	0	0	0	0	3,135	
Total Own Use	—	—	—	—	—	—	—	—	—	—	—	—	0	0	66	0	0	0	0	0	66	
Total Fuel Combustion:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	9,212	
INDUSTRIAL PROCESSES***	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
NON-ENERGY	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Petrochemicals	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	
Asphalt, Lube Oils, Other	0	0	0	0	0	0	0	0	0	0	0	1,634	0	356	0	0	0	0	0	0	1,989	
Total Non-Energy:	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	554	
FUEL TOTALS:	—	—	—	—	—	—	—	—	—	—	—	59,226	44,550	2,396	7,832	29,078	1,304	38,214	38,214	144,387	GRAND TOTAL	

* ... = not available
 - LFO = light fuel oil, "HFO" = heavy fuel oil, "Motor Gas" = motor gasoline, "Aviat. Turbo" = aviation turbo, "Aviat. Gas" = aviation gas, "Petrol. Coke" = petroleum coke, "NGLs" = natural gas liquids (such as propane and butane), "Cdn. Bitum." = Canadian bituminous coal, "U.S. Bitum." = U.S. bituminous coal.

* Where a total differs from the sum of the individual amounts by one or two kilotonnes, it is due to rounding
 * CO₂ emissions from burning of wood/waste are not included. The following sectors had CO₂ emissions from wood/waste fuel combustion: RESIDENTIAL, Total: 2,566 kt; INDUSTRIAL, Pulp and Paper: 6,997 kt; ELECTRICITY GENERATION: 448 kt.

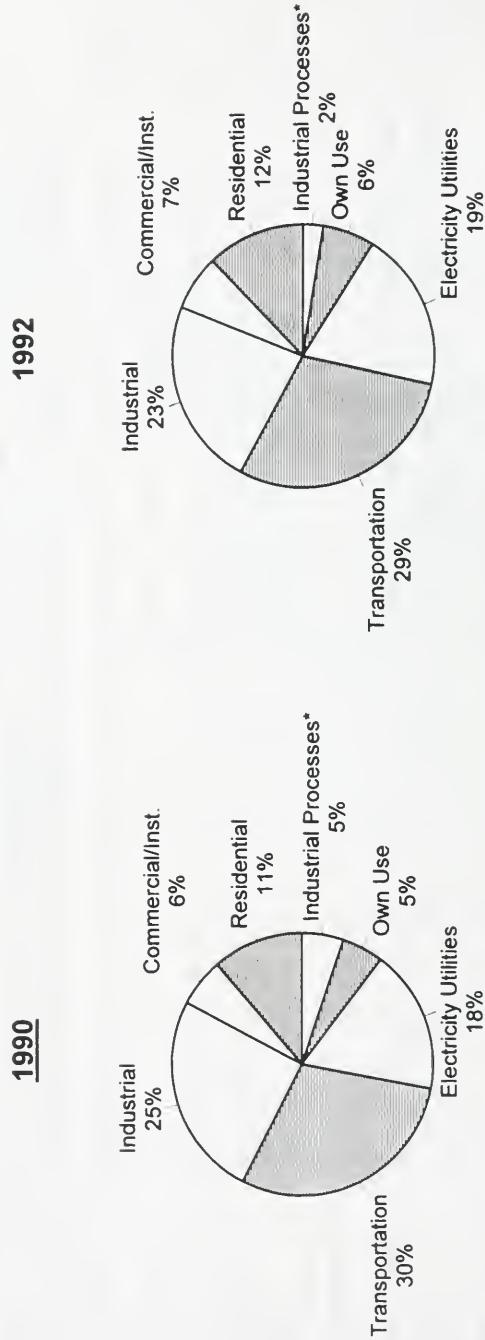
** "Other" Industrial sectors include Auto Production, Food and Beverages, Iron Foundries and Non-Metallic Minerals and may include some other sectors not listed in this table
 *** This table does not account for CO₂ emissions from the following industrial processes: cement production, lime production, and striped natural gas.

**** "Non-energy use" means that the CO₂ emissions do not result from fuel combustion, but rather, from the use of fuels as raw materials in industrial processes.

***** It is uncertain whether this data accounts for CO₂ emissions from the non-energy use of petroleum coke in the aluminum and electrical product industries.

SOURCE: Ontario MOEE, Policy Division, Economic Services Branch, June 1994

Figure A-16. Ontario CO₂ Emission Distribution by Sector
- 1990 and 1992.



*Industrial processes do not include the emissions from fuel combustion.

Emission Change Percentages

Since FRED Version 2 was published in 1991, there has been continual refining and updating of the Ontario emission estimates. New estimation methodologies and updated industrial process information have become available, and thus some of the Ontario emission estimates presented in this document are different than those in FRED Version 2. Table A-28 summarizes these changes. The following notes point out the sectors in which there have been significant changes, and explain the reasons for the changes.

A AREA SOURCES

A.1 On-road Vehicles

In FRED V2, emissions from road vehicles were estimated using MOBILE 4C emission factors whereas the emissions presented here were estimated using the latest MOBILE 5C emission factors. This change has affected NO_x, VOC and CO emissions. The annual distance travelled by vehicles was also revised with updated statistics and affects all emissions in this sector, including SO₂.

A.2 Off-highway Vehicles/Engines

More emission sources are included in this sector in FRED V3, resulting in the increase of all criteria pollutants emissions.

A.3 Residential Fuelwood Combustion

The emission factors for this sector were revised, resulting in a significant increase in the VOC emissions from fireplaces.

A.4 Solvent Evaporation Sources

The VOC emissions from general solvent use and from surface coating application were revised with the results from a new study, resulting in an increase in VOC emissions in this sector.

A.5 Forest Fires

Although the emissions from forest fires are presented in the Ontario emission tables, they are not included in the area sources sub-total and the Ontario total. In FRED V2, they were included in the Ontario total.

B Point Sources

B.1 Non-ferrous Smelters

The NO_x emissions from this sector were updated with new process information, resulting in an increase in emissions.

B.2 Primary Metal Processing

The process activities and emission factors in this sector were updated resulting in an increase in all pollutant emissions.

B.3 Petroleum Refineries

The emissions in this sector were revised with new study results from the Canadian Petroleum Products Institute. The inclusion of fugitive VOC emissions resulted in an increase in overall VOC emissions.

B.4 Other Manufactures

More emission sources are included, resulting in an increase in all pollutant emissions.

Table A-28 summarizes the percentage changes in emissions by category. Please note that the percentage changes for point sources, area sources and on-road vehicles are also reflected in the Ontario total.

Table A-28. Percentage Changes in Ontario Emission Amounts
from Fred V2 to Fred V3

CATEGORY/SECTOR	YEAR	SO ₂	NO _x	VOC
Ontario Total	1985	0.3%	19.3%	41.9%
	1986	- 0.2%	17.3%	33.1%
	1987	0.2%	16.9%	36.1%
	1988	1.9%	12.7%	21.1%
Point Sources <small>(B.1 to B.4)</small>	1985	0.0%	27.3%	123.9%
	1986	- 0.7%	30.1%	116.3%
	1987	- 0.4%	29.5%	121.8%
	1988	1.1%	33.4%	150.0%
Area Sources <small>(A.1 to A.5)</small>	1985	7.7%	15.6%	33.4%
	1986	9.5%	11.8%	24.5%
	1987	11.7%	11.1%	26.9%
	1988	16.1%	4.0%	9.2%
On-road Vehicles <small>(A.1)</small>	1985	-3.8%	13.1%	25.8%
	1986	-1.9%	9.5%	22.3%
	1987	-1.7%	4.4%	17.1%
	1988	9.0%	-0.5%	10.9%

FAST REFERENCE EMISSION DOCUMENT

VERSION 3

SECTION B: CANADA EMISSIONS

TABLE B-1. CANADA SO₂ EMISSION TRENDS BY PROVINCE, 1980 - 2000.
(Thousand metric tonnes)

PROVINCE	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991*	1992*	1993*	1994*	1995*	2000*
EAST																	
MANITOBA	484	421	362	408	466	469	***	559	566	515	508.1	552.1	564.5	530.4	397.9	434.7	450.5
NEW BRUNSWICK	218	221	206	172	162	138	***	216	210	229	181.6	173.9	196.2	161.7	135.0	133.8	153.3
NEWFOUNDLAND	56	41	42	36	38	43	***	51	45	53	66.3	65.2	59.8	65.1	55.4	76.4	60.5
NOVA SCOTIA	193	193	179	175	201	170	***	178	183	183	179.1	178.0	177.4	181.5	159.1	153.1	151.0
P.E.I.SLAND	1,758	1,642	1,400	1,274	1,567	1,461	1,343	1,411	1,407	1,366	1,192.1	1,101.8	912.4	815.8	818.5	702.7	840.0
QUEBEC	1,098	1,002	932	792	737	693	***	654	712	546	396.1	426.8	437.3	441.5	438.4	433.2	459.9
EASTERN TOTAL	3,812	3,522	2,865	2,860	3,172	2,976	2,800 **	3,072	3,126	2,895	2,527	2,503	2,353	2,201	1,810	1,938	2,121
WEST																	
ALBERTA	599	543	504	513	517	539	***	***	***	***	521.8	535.8	583.2	804.1	839.7	647.8	619.0
BRITISH COLUMBIA	167	166	160	155	151	105	***	***	***	***	104.5	96.7	99.1	95.9	101.2	102.4	108.7
NW TERR. + YUKON ***	2	2	2	2	2	2	***	1.7	***	***	15.2	15.0	15.5	4.7	15.1	15.5	16.9
YUKON ***	..	..	..	..	..	..	..	..	..	..	1.5	1.5	1.5	1.5	1.5	1.5	1.4
SASKATCHEWAN	55	56	82	97	111	88	***	..	..	..	89.8	89.2	92.0	100.0	102.3	96.2	94.7
WESTERN TOTAL	823	767	747	767	781	732	800 **	700 **	700 **	900 **	732	738	771	816	860	883	841
CANADA TOTAL	4,635	4,289	3,813	3,627	3,953	3,707	3,600 **	3,800 **	3,800 **	3,800 **	3,280	3,241	3,124	3,017	2,670	2,802	2,962

*** = not available.

* Except for Ontario, provincial and territorial amounts for 1991 to 2000 are entirely forecast from the 1990 amount.

** Eastern total for 1986, Western totals for 1983-1985, and Canada totals for 1986-1989 are rounded to the nearest hundred thousand metric tonnes.

*** From 1985 onwards, this number is for the NW Territories only.

**** The NW Territories and Yukon amounts are lumped together prior to 1985.

Sources:

- Ontario, 1985 - 2000: Ontario MOEE, December 1995/January 1996.

- Ontario, 1980-1984: Ontario MDE.

- All provinces and territories (except Ontario), 2000: Environment Canada, Pollution Data Branch, September 1995.

- All provinces and territories (except Ontario), 1990-1995: Environment Canada, Pollution Data Branch, October 1995.

- Eastern provinces (except Ontario), 1980 and 1989: "Annual Report on the Eastern Canada Acid Rain Program, 1992", Environment Canada.

- Eastern provinces (except Ontario), 1988: "Annual Report on the Federal-Provincial Agreements for the Eastern Canada Acid Rain Program - 1991", Environment Canada, December 1993.

- Eastern provinces (except Ontario), 1987: "Annual Report on the Federal-Provincial Agreements for the Eastern Canada Acid Rain Program - 1990", Report EN 40-11/29 - 1990-E.

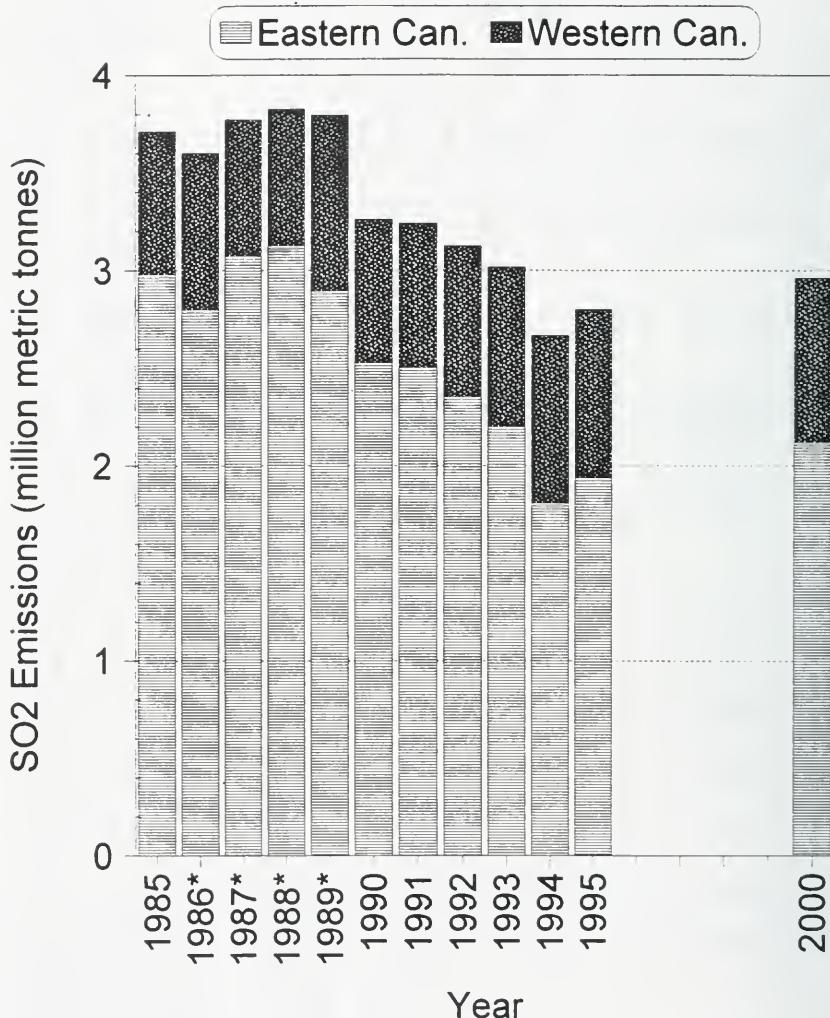
- Eastern provinces and territories (except Ontario), 1992: Environment Canada, December, 1992.

- Eastern provinces and territories (except Ontario), 1981-1984: Environment Canada report, "Canadian Emissions Inventory of Common Air Contaminants (1985)", EPS 5/AP/3, March 1990.

- Eastern provinces (except Ontario), 1980-1984: Environment Canada, Conservation and Protection Section, May 1987.

- Canada totals, 1986-1989: Western totals, 1986-1989, end Eastern total, 1986: Preliminary data from Environment Canada, Pollution Data Analysis Division, February 1994.

FIGURE B-1. CANADA SO₂ EMISSIONS TREND BY REGION, 1985 - 2000.



* Eastern total for 1986, and Western totals for 1986-1989 are rounded to the nearest hundred thousand metric tonnes.

**FIGURE B-2. CANADA SO₂ EMISSIONS DISTRIBUTION BY PROVINCE -
1990 AND 1995.**

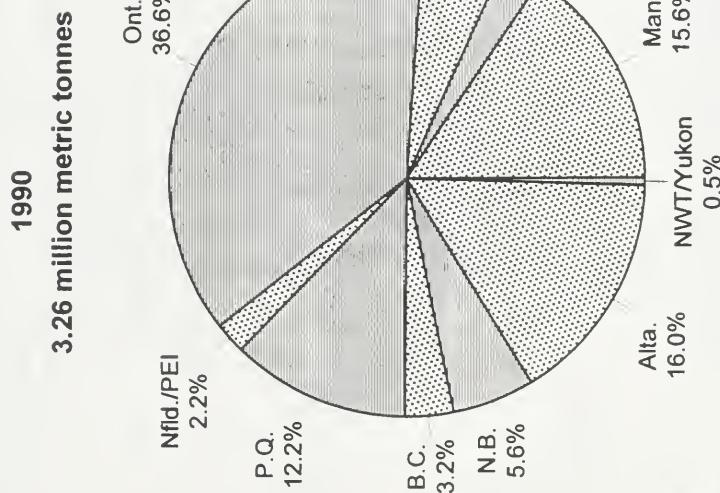


TABLE B-2. CANADA NO_x EMISSION TRENDS BY PROVINCE, 1985 - 2000.

(Thousands metric tonnes)

PROVINCE	1985*	1986*	1987*	1988*	1989*	1990	1991**	1992**	1993**	1994**	1995**	2000**
MANITOBA	85.1	82.2	82.7	81.1	76.8	74.0	68.8	65.7	66.5	65.7	73.6	74.3
NEW BRUNSWICK	69.0	71.5	70.8	72.6	68.4	67.8	65.7	66.1	65.7	65.9	62.1	62.3
NEWFOUNDLAND	40.2	40.3	40.6	44.0	43.7	42.8	41.1	40.3	38.9	38.8	37.9	38.2
NOVA SCOTIA	71.0	72.2	69.7	73.1	73.7	73.4	70.7	70.3	68.1	68.2	68.5	69.1
ONTARIO	665.1	656.5	683.9	695.6	702.4	653.2	582.4	567.8	539.9	524.4	537.5	559.9
P.E.I. ISLAND	7.4	7.5	7.4	7.6	7.8	7.7	7.1	7.3	7.1	6.9	7.1	6.9
QUEBEC	274.9	281.3	298.9	314.2	313.9	300.6	288.6	282.4	280.4	278.1	285.3	272.7
EASTERN TOTAL	1,213	1,212	1,254	1,288	1,287	1,220	1,124	1,100	1,067	1,048	1,072	1,083
ALBERTA	418.5	430.5	452.5	490.7	494.4	486.7	470.5	463.3	487.2	498.5	498.4	513.9
BRITISH COLUMBIA	224.9	221.8	238.0	246.4	248.3	242.5	238.4	243.6	250.7	256.1	294.2	305.6
NW TERR.	7.3	7.8	8.2	8.7	9.2	8.5	8.4	8.7	8.7	8.7	8.7	9.0
SASKATCHEWAN	173.7	165.9	172.0	162.8	149.0	142.7	156.2	152.0	163.5	167.3	199.4	203.3
YUKON	5.8	5.9	6.0	6.2	6.4	6.1	6.0	6.0	5.9	5.9	6.2	6.3
WESTERN TOTAL	830	832	877	915	907	887	880	874	916	937	1,007	1,038
CANADA TOTAL	2,043	2,043	2,131	2,203	2,194	2,106	2,004	1,974	1,983	1,985	2,079	2,121

* Except for Ontario, emission amounts are entirely "backcast" from the 1990 emission amount. The Ontario emission amount is derived only partly from backcasts.

** Except for Ontario, emission amounts are entirely forecast from the 1990 emission amount. The Ontario emission amount is derived only partly from forecasts, except of course, for the year 2000, which is entirely forecast.

Sources:

- Provinces and territories other than Ontario: Environment Canada, Pollution Data Branch, September/October 1995.
- Ontario: Ontario MOEE, December 1995.

**FIGURE B-3. CANADA NO_x EMISSIONS TREND
BY REGION, 1985 - 2000.**

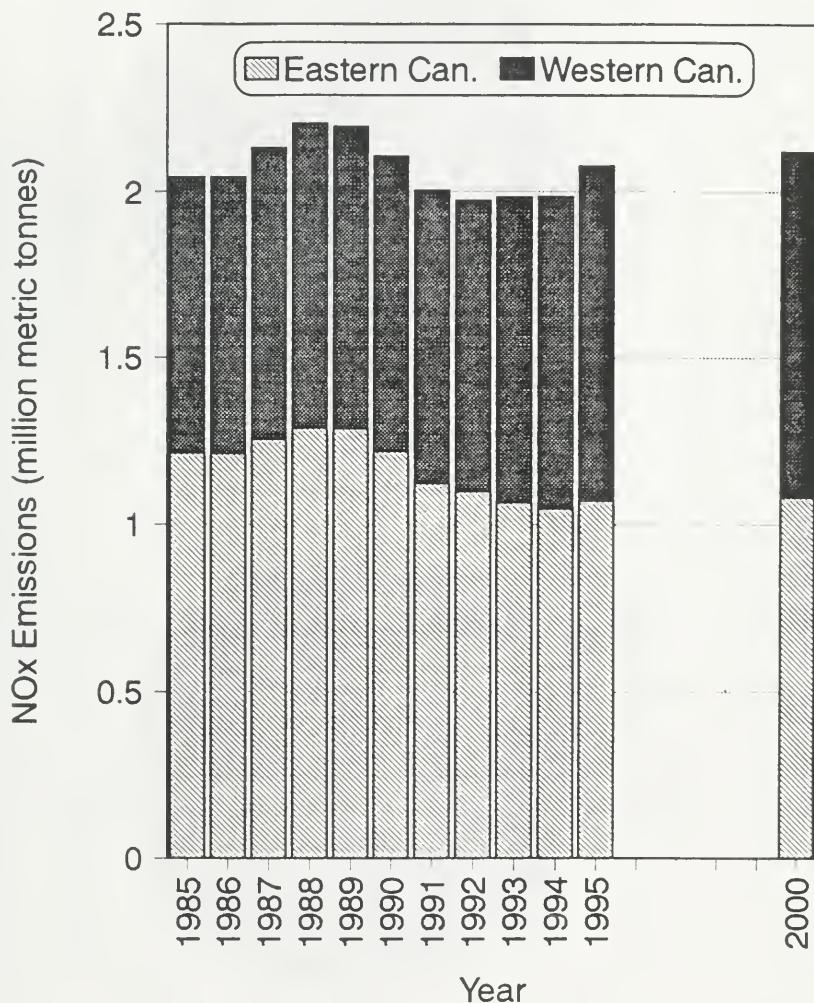
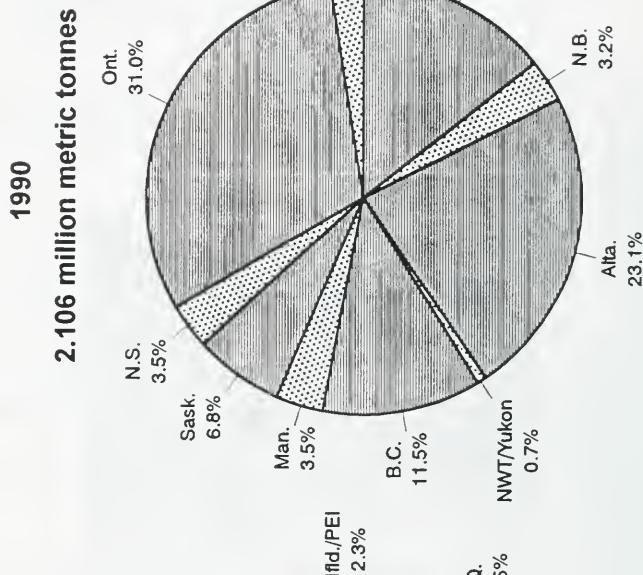
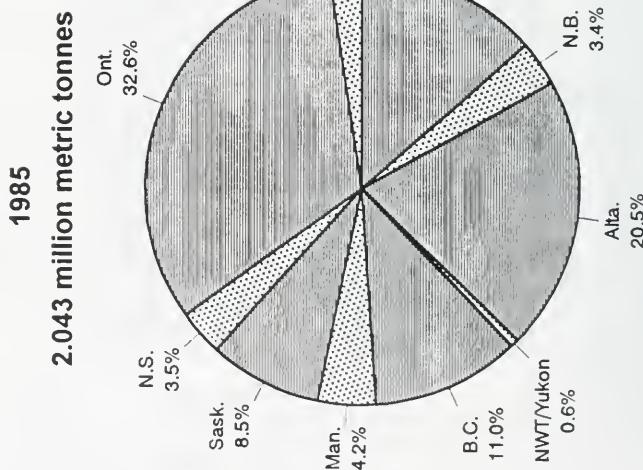


FIGURE B-4 . CANADA NO_x EMISSIONS DISTRIBUTION BY PROVINCE - 1985 AND 1990.



**FIGURE B-5 . CANADA NOX EMISSIONS DISTRIBUTION BY PROVINCE -
1985 AND 1995.**

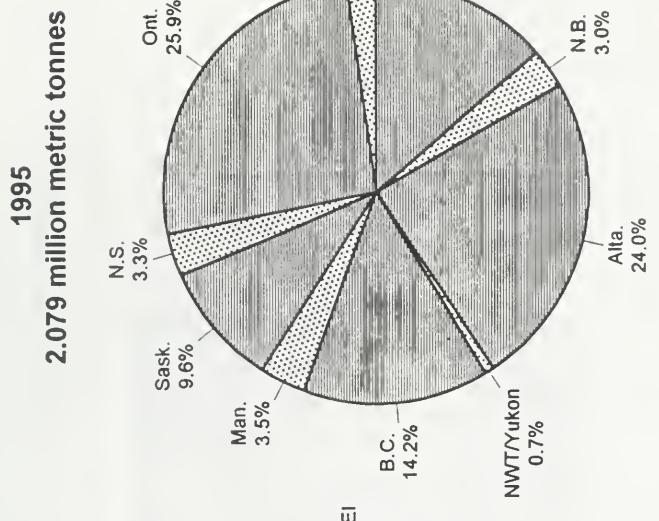
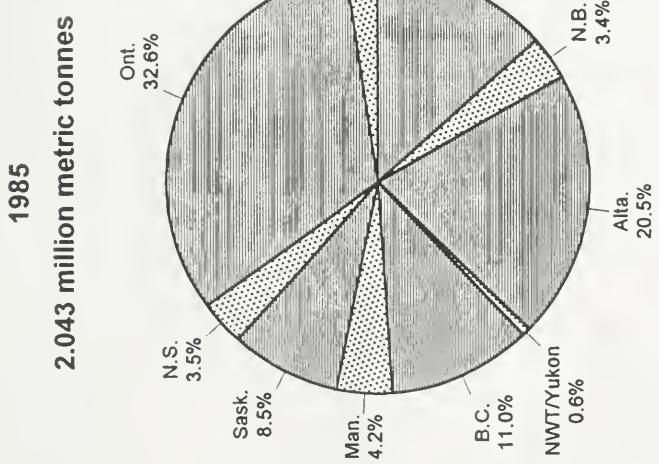


TABLE B-3. CANADA VOC EMISSION TRENDS BY PROVINCE, 1985 - 2000*.

(Thousand metric tonnes)

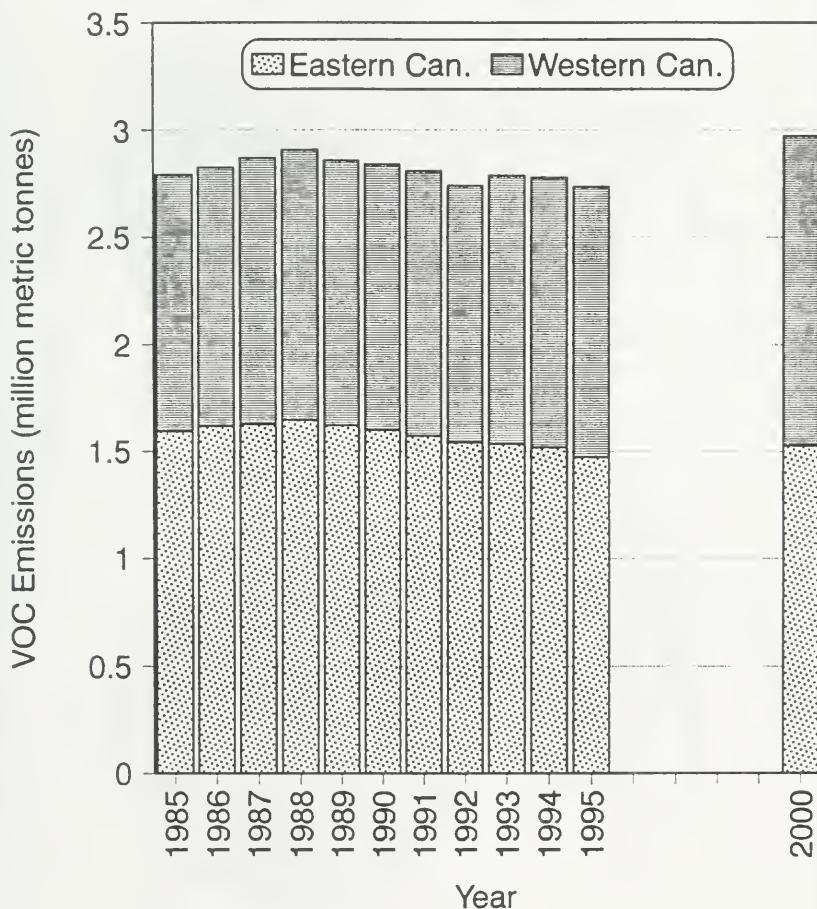
PROVINCE	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	2000
EAST												
MANITOBA	98.3	94.9	93.6	86.7	85.6	90.5	85.5	84.8	77.2	76.7	76.0	75.3
NEW BRUNSWICK	44.1	44.6	45.9	46.5	43.8	41.3	39.3	36.7	39.0	38.7	38.3	36.7
NEWFOUNDLAND	49.1	49.0	48.3	51.6	53.5	50.4	48.9	47.2	47.5	46.4	46.0	44.5
NOVA SCOTIA	81.4	80.3	77.9	76.2	73.0	73.2	70.6	68.1	68.7	67.3	65.8	64.5
ONTARIO	887.7	913.2	923.8	939.1	929.3	907.3	911.6	895.8	896.6	887.4	846.9	906.6
P.E.ISLAND	23.2	23.2	22.3	21.8	20.5	20.4	19.3	19.3	19.6	19.1	19.1	19.1
QUEBEC	408.7	413.3	415.0	421.1	417.6	417.3	399.1	389.1	386.3	383.4	382.9	378.7
EASTERN TOTAL	1,593	1,619	1,627	1,647	1,623	1,600	1,574	1,541	1,535	1,519	1,475	1,525
WEST												
ALBERTA	779.8	765.3	791.3	845.3	818.7	814.3	813.9	808.6	836.0	837.2	838.9	1,000.4
BRITISH COLUMBIA	255.1	255.9	272.0	274.7	269.8	256.6	249.9	246.9	258.7	263.0	263.3	281.6
NW TERRITORIES	7.9	7.9	8.4	8.2	11.5	9.2	9.0	9.1	9.3	9.5	9.6	9.9
YUKON	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8
SASKATCHEWAN	152.8	173.9	169.4	130.1	133.0	157.0	158.8	131.9	144.8	146.8	146.6	153.0
WESTERN TOTAL	1,198	1,205	1,243	1,260	1,235	1,239	1,198	1,251	1,258	1,260	1,447	
CANADA TOTAL	2,790	2,824	2,870	2,907	2,858	2,839	2,808	2,739	2,786	2,777	2,735	2,972

* Except for Ontario, all the provincial and territorial amounts from 1985 to 1989 inclusive are entirely "backcast" from the 1990 amount. Except for Ontario, all the provincial and territorial amounts for 1991 to 2000 inclusive are entirely forecast from the 1990 amount.

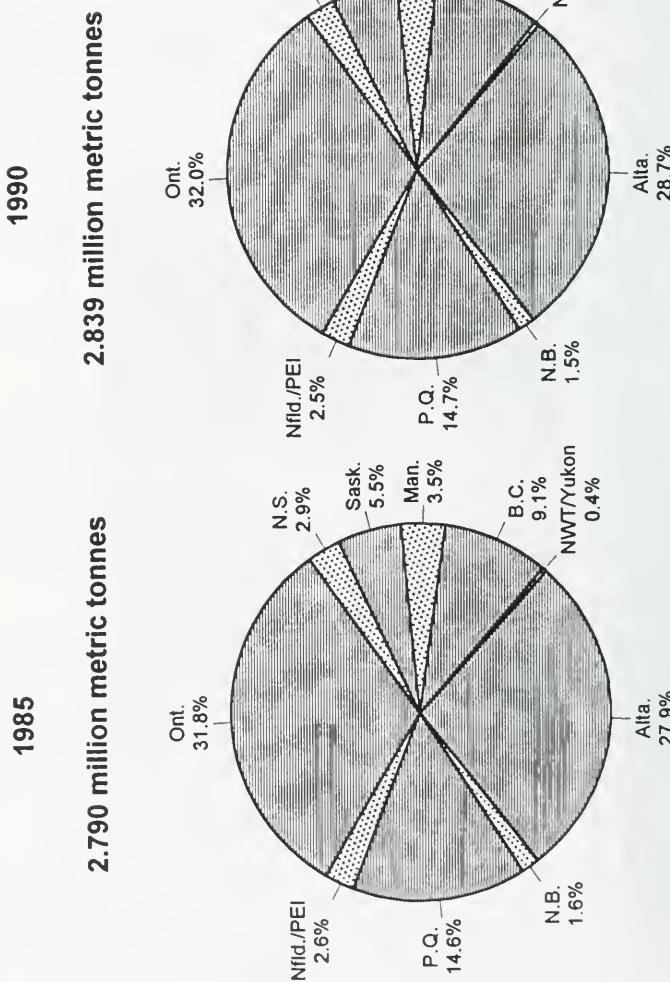
Sources:

- Provinces and territories other than Ontario: Environment Canada, Pollution Data Branch, September/October 1995.
- Ontario: Ontario MOEE, December 1995.

FIGURE B-6. CANADA VOC EMISSIONS TREND BY REGION, 1985 - 2000.



**FIGURE B-7. CANADA VOC EMISSIONS DISTRIBUTION BY PROVINCE -
1985 AND 1990**



**FIGURE B-8. CANADA VOC EMISSIONS DISTRIBUTION BY PROVINCE -
1985 AND 1995.**

1985

2.790 million metric tonnes

Ont.
31.8%

Nfld./PEI
2.6%

P.Q.
14.6%

N.B.
1.6%

Alta.
27.9%

Nfld./PEI
2.4%

P.Q.
14.0%

B.C.
9.1%

N.W.T/Yukon
0.4%

Sask.
5.5%

N.B.
1.4%

B.C.
9.6%

N.W.T/Yukon
0.4%

Sask.
5.4%

Man.
2.8%

B.C.
9.6%

N.W.T/Yukon
0.4%

Sask.
5.4%

Man.
2.8%

B.C.
9.6%

N.W.T/Yukon
0.4%

1995

2.735 million metric tonnes

Ont.
31.0%

Nfld./PEI
2.4%

P.Q.
14.0%

B.C.
9.6%

Alta.
30.7%

Sask.
5.4%

Man.
2.8%

B.C.
9.6%

N.W.T/Yukon
0.4%

Sask.
5.4%

Man.
2.8%

B.C.
9.6%

N.W.T/Yukon
0.4%

**TABLE B-4. CANADA 1985 SO₂, NO_x and VOC EMISSIONS BY PROVINCE/TERRITORY
AND SECTOR.**
(Thousands metric tonnes)

	Nfld.	PEI	NS	NB	Que.	Ont.	Man.	Sask.	Alta.	BC	YT	NWT	Canada
SO ₂													
Transportation	2.2	0.3	3.4	1.8	32.3	35.3	3.0	3.4	4.5	11.9	0.0	0.3	98.5
Fuel Combustion and Industrial Processes	41.1	1.3	167.1	135.9	659.7	1,424.8	466.1	82.2	534.0	92.9	0.3	1.4	3,606.8
Incineration/Miscellaneous	0.0	0.0	0.0	0.0	0.7	0.7	0.0	0.0	0.1	0.3	0.0	0.0	2.1
total	43.4	1.7	170.4	137.7	692.7	1,460.7	469.2	85.6	538.7	105.1	0.4	1.7	3,707.4
NO _x													
Transportation	22.9	6.0	38.6	37.0	222.1	405.4	76.1	128.6	202.5	118.5	4.2	4.1	1,266.0
Fuel Combustion and Industrial Processes	12.5	0.9	10.0	11.0	48.3	161.7	7.3	14.0	148.1	67.2	0.1	0.4	481.5
Power Generation	4.8	0.4	22.1	20.8	3.6	94.5	1.6	30.9	67.5	1.9	1.5	2.8	252.4
Incineration/Miscellaneous	0.1	0.1	0.3	0.2	1.0	3.5	0.1	0.1	0.3	37.3	0.0	0.0	43.0
total	40.2	7.4	71.0	69.0	274.9	665.1	85.1	173.7	418.5	224.9	5.8	7.3	2,042.9
VOC													
Transportation	16.5	4.6	25.2	25.9	171.2	324.3	49.5	77.2	126.6	90.4	1.5	1.6	914.5
Fuel Combustion and Industrial Processes	23.2	14.6	40.6	2.8	87.6	251.7	5.8	7.1	464.9	96.7	0.0	5.2	1,000.2
Power Generation	0.1	0.0	0.1	0.2	0.0	0.4	0.0	0.2	0.7	0.1	0.1	0.1	2.0
Incineration/Miscellaneous	9.3	4.1	15.4	15.2	149.9	311.3	42.9	68.1	187.6	68.0	0.5	1.0	873.3
total	49.1	23.2	81.4	44.1	408.7	887.7	98.3	152.8	779.8	255.1	2.1	7.9	2,790.0

SOURCES:

- SO₂ numbers for all provinces/territories except Ontario: Environment Canada report, "Canadian Emissions Inventory of Common Air Contaminants (1985)", report EPS 5/AP/3, March 1990.
- NO_x and VOC numbers for all provinces/territories except Ontario: Environment Canada, Pollution Data Branch, October 1995.
- Ontario SO₂, NO_x and VOC numbers: Ontario MOEE, December 1995.

TABLE B-5. CANADA 1990 SO₂, NO_x and VOC EMISSIONS BY PROVINCE/TERRITORY AND SECTOR.

(Thousands metric tonnes)

	Nfld.	PEI	NS	NB	Que.	Ont.	Man.	Sask.	Alta.	BC	YT	NWT	Canada
SO₂													
Transportation	1.8	0.3	2.3	1.8	36.1	51.0	1.6	2.3	10.4	25.1	0.3	0.3	133.3
Fuel Combustion and Industrial Processes	64.5	3.8	176.6	179.8	359.1	1,140.4	506.5	87.2	511.0	75.5	1.2	14.8	3,120.4
Incineration/Miscellaneous	0.0	0.0	0.1	0.1	1.0	0.8	0.1	0.1	0.2	3.9	0.0	0.0	6.3
total	66.3	4.2	179.1	181.6	396.1	1,192.1	508.1	89.6	521.6	104.5	1.5	15.2	3,259.9
NO_x													
Transportation	25.8	6.4	37.8	35.4	242.9	401.0	64.1	92.6	208.6	128.5	4.2	4.8	1,252.1
Fuel Combustion and Industrial Processes	11.9	0.9	12.3	10.3	53.1	173.6	8.4	14.5	189.9	73.9	0.1	0.4	549.3
Power Generation	5.0	0.4	23.0	21.7	3.5	77.5	1.4	35.4	87.9	1.9	1.8	3.2	262.7
Incineration/Miscellaneous	0.1	0.1	0.3	0.3	1.1	1.1	0.1	0.1	0.4	38.1	0.0	0.0	41.7
total	42.8	7.7	73.4	67.8	300.6	653.2	74.0	142.7	486.7	242.5	6.1	8.5	2,105.8
VOC													
Transportation	16.2	4.2	21.5	22.3	163.8	291.0	40.9	60.2	109.1	79.4	1.3	1.5	811.4
Fuel Combustion and Industrial Processes	24.5	12.1	36.2	2.8	95.9	279.7	5.6	7.4	481.6	104.6	0.0	6.4	1,056.8
Power Generation	0.1	0.0	0.1	0.2	0.0	0.4	0.0	0.3	0.9	0.1	0.1	0.1	2.3
Incineration/Miscellaneous	9.6	4.0	15.4	16.0	157.6	336.2	43.9	89.0	222.7	72.4	0.6	1.2	968.6
total	50.4	20.3	73.2	41.3	417.3	907.4	90.5	157.0	814.3	256.6	1.9	9.2	2,839.2

SOURCES:

- All provinces except Ontario: Environment Canada, Pollution Data Branch, October 1995.
- Ontario: Ontario MOEE, December 1995.

TABLE B-6. CANADA 1995 SO₂, NO_x and VOC EMISSIONS BY PROVINCE/TERRITORY AND SECTOR
 (Thousand metric tonnes)

	Nfld.	PEI	NS	NB	Que.	Ont.	Man.	Sask.	Alta.	BC	YT	NWT	Canada
SO₂													
Transportation	1.6	0.3	2.0	1.5	34.3	46.8	1.5	2.6	10.1	26.2	0.2	0.3	127.4
Fuel Combustion and													
Industrial Processes	74.7	4.0	150.9	132.1	397.9	655.0	433.1	93.5	637.5	71.3	1.2	15.3	2,666.5
Incineration/Miscellaneous	0.0	0.0	0.1	0.1	1.0	0.9	0.1	0.1	0.2	4.9	0.0	0.0	7.4
total	76.4	4.4	153.1	133.8	433.2	702.7	434.7	96.2	647.8	102.4	1.5	15.5	2,801.3
NO_x													
Transportation	22.8	5.6	33.0	31.2	216.7	360.1	56.3	106.8	189.6	129.3	3.9	5.1	1,160.4
Fuel Combustion and													
Industrial Processes	11.8	1.3	111.8	9.1	66.5	130.9	16.1	52.4	206.7	115.0	0.5	0.5	622.6
Power Generation	3.1	0.1	23.4	21.6	0.9	44.0	1.1	40.0	101.7	2.0	1.8	3.2	242.9
Incineration/Miscellaneous	0.1	0.1	0.2	0.3	1.1	2.6	0.1	0.1	0.4	47.9	0.0	0.0	52.9
total	37.9	7.1	68.5	62.1	285.3	537.5	73.5	199.4	498.4	294.2	6.2	8.7	2,078.8
VOC													
Transportation	13.2	3.4	16.6	18.2	127.1	234.4	32.0	51.6	92.9	63.8	1.1	1.4	655.7
Fuel Combustion and													
Industrial Processes	22.4	11.3	33.6	3.0	97.9	269.3	5.4	6.2	488.1	112.7	0.0	6.9	1,056.8
Power Generation	0.1	0.0	0.1	0.2	0.0	0.6	0.0	0.3	1.1	0.1	0.1	0.1	2.7
Incineration/Miscellaneous	10.2	4.3	15.4	16.9	157.8	342.6	38.5	88.4	256.8	86.6	0.6	1.2	1,019.3
total	46.0	19.1	65.8	38.3	382.9	846.9	76.0	146.6	838.9	263.3	1.8	9.6	2,734.5

Sources:

- Provinces/territories other than Ontario: Environment Canada, Pollution Data Branch, October 1995.
- Ontario, other than the exceptions noted below: Ontario MOEE, December 1995.
- Ontario VOC-Power Generation sector : Environment Canada, Pollution Data Branch, October 1995.
- Ontario VOC-Fuel Combustion and Industrial Processes sector: Derived from Ontario MOEE data (December 1995) and from Environment Canada Pollution Data Branch data (October 1995).

TABLE B-7. CANADA 1985 TOP 10 SO₂ POINT SOURCES.

RANK	SOURCE NAME	SOURCE TYPE	PROVINCE	SO ₂ EMITTED (metric tonnes)
1	Inco	smelter	Ontario	695,000
2	Noranda	smelter	Quebec	436,000
3	Hudson Bay M&S	smelter	Manitoba	270,000
4	Inco	smelter	Manitoba	188,000
5	Nanticoke TGS	power plant	Ontario	169,000
6	Lambton TGS	power plant	Ontario	118,000
7	Algoma Ore - Wawa	iron ore sintering	Ontario	112,000
8	Lingan	power plant	Nova Scotia	85,000
9	Falconbridge	smelter	Ontario	74,400
10	Lakeview TGS	power plant	Ontario	43,800
TOTAL OF TOP 10 SOURCES:				2,191,200

Sources

- Ontario: MOE.
- Other provinces: Estimates from Environment Canada, Conservation and Protection Section, April 1988.

FAST REFERENCE EMISSION DOCUMENT

VERSION 3

SECTION C: UNITED STATES EMISSIONS



Table C-1. United States SO₂ Emission Trend, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FUEL COMBUSTION, ELECTRICITY	14,763	14,244	14,257	14,506	14,713	14,423	14,323	13,987	13,781	13,489
FUEL COMBUSTION, INDUSTRIAL	2,875	2,827	2,783	2,822	2,800	2,818	2,644	2,723	2,669	2,748
FUEL COMBUSTION, OTHER	525	554	601	599	566	540	537	543	543	543
CHEMICAL & ALLIED PRODUCT MFG.	414	392	386	407	399	399	399	406	408	415
METALS PROCESSING	945	806	588	641	631	601	574	590	605	628
PETROLEUM & RELATED INDUSTRIES	458	425	404	402	389	399	383	378	371	368
OTHER INDUSTRIAL PROCESSES	386	387	379	373	367	364	355	364	375	391
SOLVENT UTILIZATION	1	1	1	1	1	1	1	1	1	1
STORAGE & TRANSPORT	4	4	4	5	5	5	5	5	5	5
WASTE DISPOSAL & RECYCLING	31	32	32	33	33	33	33	34	34	34
ON-ROAD VEHICLES	474	478	488	502	517	518	517	524	469	268
NON-ROAD SOURCES	189	200	211	230	242	240	241	248	252	257
MISCELLANEOUS	10	8	12	24	9	13	9	8	7	13
TOTAL ALL SOURCES	21,073	20,358	20,144	20,544	20,671	20,353	20,021	19,811	19,520	19,158

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994*,
EPA-454/R-95-011, October 1995, USEPA.

[2] The emissions are reported in thousand short tons in the original report. They are converted to
thousand tonnes (gigagrams) by multiplying 0.9072.

[3] "Miscellaneous" includes emissions from forest fires and 'other' categories that could not be
accurately allocated to specific source categories.

[4] Zero values represent less than 454 tonnes (500 short tons) per year

[5] Components may not add up to totals due to rounding.

Figure C-1. United States SO₂ Emission Trend, 1985-1994

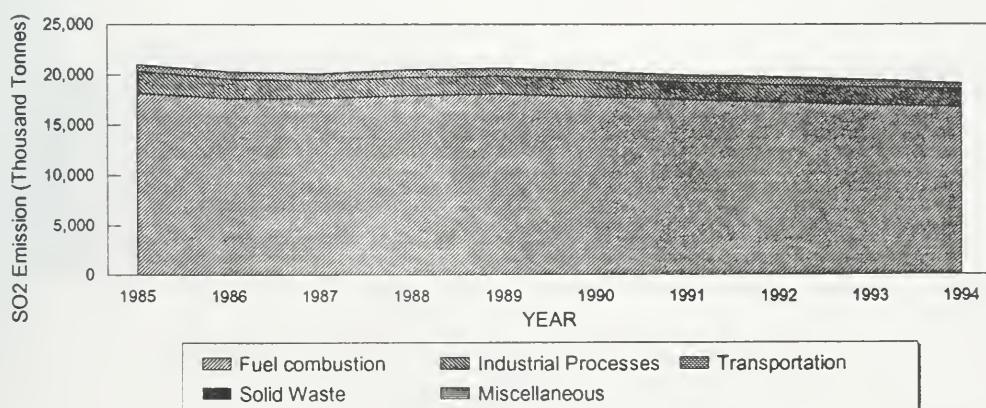


Table C-2. United States NOx* Emission Trend, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FUEL COMBUSTION, ELECTRICITY	6,274	6,268	6,467	6,831	6,901	6,819	6,793	6,781	7,052	7,072
FUEL COMBUSTION, INDUSTRIAL	2,911	2,781	2,779	2,891	2,911	2,954	2,880	2,918	2,900	2,908
FUEL COMBUSTION, OTHER	646	630	640	671	668	646	652	662	659	660
CHEMICAL & ALLIED PRODUCT MFG.	238	240	231	249	248	250	252	258	259	264
METALS PROCESSING	79	73	68	74	75	73	71	73	73	76
PETROLEUM & RELATED INDUSTRIES	112	99	92	91	88	91	88	87	86	86
OTHER INDUSTRIAL PROCESSES	297	298	290	286	282	278	269	277	286	298
SOLVENT UTILIZATION	2	3	3	3	3	2	2	3	3	3
STORAGE & TRANSPORT	2	2	2	2	2	2	2	3	3	3
WASTE DISPOSAL & RECYCLING	79	79	77	77	76	74	75	75	76	77
ON-ROAD VEHICLES	7,338	7,052	6,941	6,950	6,969	6,793	6,689	6,750	6,813	6,831
NON-ROAD SOURCES	2,480	2,519	2,417	2,644	2,580	2,579	2,537	2,617	2,708	2,808
MISCELLANEOUS	280	233	318	659	265	338	257	226	199	339
TOTAL ALL SOURCES	20,739	20,274	20,325	21,427	21,068	20,899	20,567	20,729	21,117	21,424

* NOx expressed as NO₂

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994*, EPA-454/R-95-011, October 1995, USEPA.

[2] The emissions are reported in thousand short tons in the original report. They are converted to thousand tonnes (gigagrams) by multiplying 0.9072.

[3] "Miscellaneous" includes emissions from forest fires and 'other' categories that could not be accurately allocated to specific source categories.

[4] Zero values represent less than 454 tonnes (500 short tons) per year

[5] Components may not add up to totals due to rounding.

Figure C-2. United States NOx* Emission Trend, 1985-1994

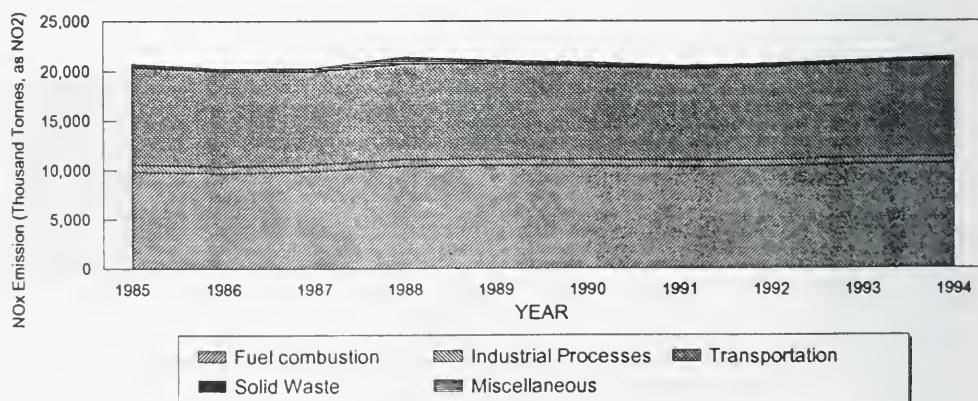


Table C-3. United States VOC Emission Trend, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FUEL COMBUSTION, ELECTRICITY	29	31	31	34	34	33	33	32	33	33
FUEL COMBUSTION, INDUSTRIAL	122	121	119	123	122	122	122	122	122	122
FUEL COMBUSTION, OTHER	1,273	1,116	1,013	1,078	1,089	679	732	774	661	649
CHEMICAL & ALLIED PRODUCT MFG.	1,232	1,281	1,279	1,373	1,366	1,384	1,391	1,403	1,413	1,431
METALS PROCESSING	69	66	64	67	67	65	63	65	67	70
PETROLEUM & RELATED INDUSTRIES	638	604	594	585	580	583	575	579	572	572
OTHER INDUSTRIAL PROCESSES	354	358	357	370	366	364	361	366	368	373
SOLVENT UTILIZATION	5,170	5,104	5,210	5,393	5,411	5,421	5,369	5,471	5,585	5,727
STORAGE & TRANSPORT	1,585	1,518	1,634	1,671	1,590	1,596	1,560	1,583	1,594	1,608
WASTE DISPOSAL & RECYCLING	2,096	2,080	2,047	2,096	2,077	2,052	2,055	2,058	2,060	2,062
ON-ROAD VEHICLES	8,506	8,050	7,690	7,521	6,525	6,218	5,896	5,509	5,537	5,711
NON-ROAD SOURCES	1,822	1,850	1,849	1,911	1,908	1,923	1,925	1,959	2,001	2,046
MISCELLANEOUS	510	494	591	1,113	580	970	672	423	468	621
TOTAL ALL SOURCES	23,404	22,673	22,479	23,334	21,713	21,411	20,754	20,342	20,481	21,024

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994", EPA-454/R-95-011, October 1995, USEPA.

- [2] The emissions are reported in thousand short tons in the original report. They are converted to thousand tonnes (gigagrams) by multiplying 0.9072.
- [3] "Miscellaneous" includes emissions from forest fires and 'other' categories that could not be accurately allocated to specific source categories.
- [4] Zero values represent less than 454 tonnes (500 short tons) per year
- [5] Components may not add up to totals due to rounding.

Figure C-3. United States VOC Emission Trend, 1985-1994

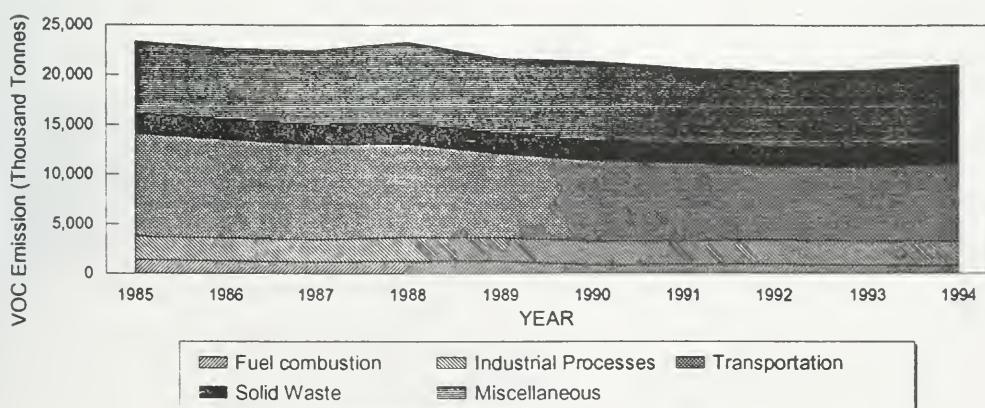


Table C-4. United States PM10 Emission Trend, 1985-1994

(Thousands Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FUEL COMBUSTION, ELECTRICITY	258	261	258	253	248	256	225	224	243	241
FUEL COMBUSTION, INDUSTRIAL	222	220	216	220	219	218	212	214	212	215
FUEL COMBUSTION, OTHER	915	806	736	782	788	502	538	568	489	480
CHEMICAL & ALLIED PRODUCT MFG.	52	53	52	55	56	56	56	57	57	58
METALS PROCESSING	129	120	114	123	124	123	118	121	123	128
PETROLEUM & RELATED INDUSTRIES	29	28	27	26	25	25	24	24	24	24
OTHER INDUSTRIAL PROCESSES	347	354	348	349	342	339	328	334	342	354
SOLVENT UTILIZATION	2	2	2	2	2	2	2	2	2	2
STORAGE & TRANSPORT	54	53	51	51	51	52	50	51	52	54
WASTE DISPOSAL & RECYCLING	252	249	240	235	228	220	221	223	225	227
ON-ROAD VEHICLES	329	323	327	335	333	324	317	311	291	282
NON-ROAD SOURCES	334	337	318	351	337	337	333	344	358	373
MISCELLANEOUS	34,215	33,617	33,958	35,765	33,966	32,901	32,783	32,992	34,387	36,424
NATURAL SOURCES	3,671	9,366	1,431	16,429	10,978	3,957	9,158	4,197	1,794	2,352
TOTAL ALL SOURCES	40,809	45,788	38,077	54,976	47,697	39,313	44,366	39,662	38,601	41,213

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994*,
EPA-454/R-95-011, October 1995, USEPA.

[2] The emissions are reported in thousand short tons in the original report. They are converted to
thousand tonnes (gigagrams) by multiplying 0.9072.

[3] "Miscellaneous" includes emissions from forest fires and 'other' categories that could not be
accurately allocated to specific source categories.

[4] Zero values represent less than 454 tonnes (500 short tons) per year

[5] Components may not add up to totals due to rounding.

Figure C-4. United States PM10 Emission Trend, 1985-1994

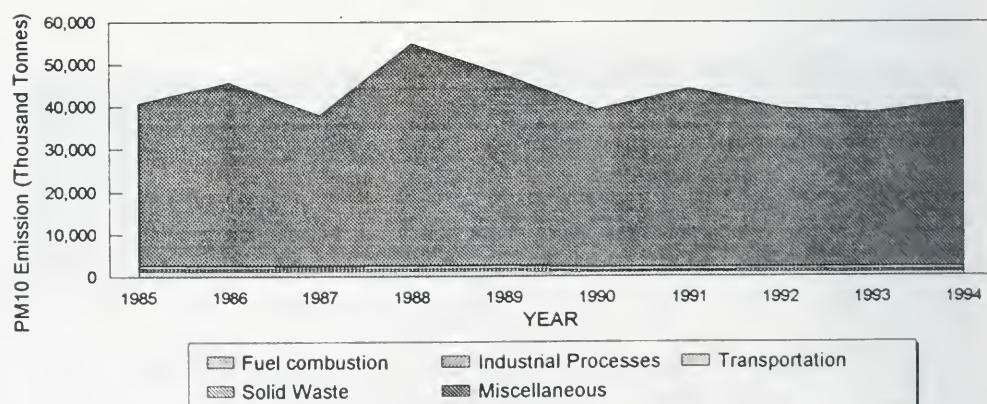


Table C-5. United States CO Emission Trend, 1985-1994

(Thousand Tonnes)

SECTOR	YEAR									
	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
FUEL COMBUSTION, ELECTRICITY	265	264	272	284	289	285	286	284	292	295
FUEL COMBUSTION, INDUSTRIAL	608	590	589	607	610	614	605	610	608	609
FUEL COMBUSTION, OTHER	6,827	5,994	5,453	5,797	5,851	3,694	3,967	4,188	3,593	3,527
CHEMICAL & ALLIED PRODUCT MFG.	1,674	1,681	1,631	1,739	1,746	1,760	1,764	1,782	1,813	1,858
METALS PROCESSING	2,017	1,886	1,800	1,906	1,934	1,887	1,807	1,854	1,897	1,965
PETROLEUM & RELATED INDUSTRIES	419	409	413	400	396	395	374	372	361	354
OTHER INDUSTRIAL PROCESSES	630	649	647	645	650	650	644	652	664	681
SOLVENT UTILIZATION	2	2	2	2	2	2	2	2	2	2
STORAGE & TRANSPORT	44	46	45	51	50	50	49	50	51	53
WASTE DISPOSAL & RECYCLING	1,761	1,738	1,678	1,638	1,585	1,530	1,543	1,558	1,571	1,584
ON-ROAD VEHICLES	70,205	66,540	64,638	64,485	59,921	57,025	56,314	54,304	54,615	55,403
NON-ROAD SOURCES	12,434	12,686	12,820	13,154	13,171	13,283	13,246	13,517	13,852	14,204
MISCELLANEOUS	7,162	6,581	8,002	14,391	7,367	10,136	7,738	6,145	6,078	8,387
TOTAL ALL SOURCES	104,048	99,066	97,989	105,099	93,571	91,311	88,339	85,318	85,397	88,921

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994*,
EPA-454/R-95-011, October 1995, USEPA.

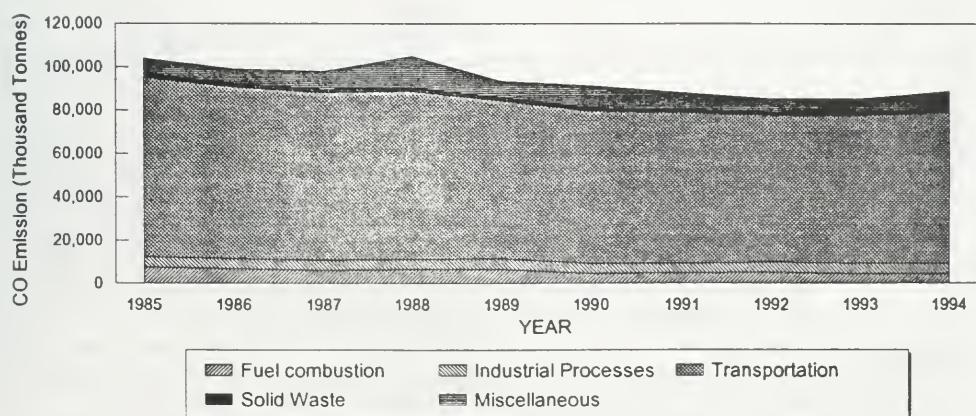
[2] The emissions are reported in thousand short tons in the original report. They are converted to
thousand tonnes (gigagrams) by multiplying 0.9072.

[3] "Miscellaneous" includes emissions from forest fires and 'other' categories that could not be
accurately allocated to specific source categories.

[4] Zero values represent less than 454 tonnes (500 short tons) per year

[5] Components may not add up to totals due to rounding.

Figure C-5. United States CO Emission Trend, 1985-1994



**Table C-6. UNITED STATES 1985 SO₂ EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	SO ₂ (kt*)	% of U.S.	Rank	WESTERN STATES	SO ₂ (kt*)	% of U.S.	Rank
ALABAMA	657	3.2%	11	ARIZONA	621	3.0%	12
ARKANSAS	104	0.5%	35	CALIFORNIA	180	0.9%	26
CONNECTICUT	73	0.4%	39	COLORADO	90	0.4%	36
DELAWARE	107	0.5%	34	IDAHO	32	0.2%	46
DIST. COLUMBIA	6	0.0%	48	KANSAS	171	0.8%	28
FLORIDA	569	2.8%	14	MONTANA	78	0.4%	37
GEORGIA	1,002	4.9%	7	NEBRASKA	49	0.2%	42
ILLINOIS	1,248	6.1%	4	NEVADA	39	0.2%	43
INDIANA	1,842	8.9%	2	NEW MEXICO	213	1.0%	24
IOWA	235	1.1%	22	NORTH DAKOTA	151	0.7%	31
KENTUCKY	757	3.7%	10	OKLAHOMA	129	0.6%	33
LOUISIANA	362	1.8%	18	OREGON	37	0.2%	44
MAINE	70	0.3%	40	SOUTH DAKOTA	33	0.2%	45
MARYLAND	281	1.4%	19	TEXAS	1,212	5.9%	5
MASSACHUSETTS	281	1.4%	20	UTAH	63	0.3%	41
MICHIGAN	490	2.4%	15	WASHINGTON	165	0.8%	29
MINNESOTA	138	0.7%	32	WYOMING	176	0.9%	27
MISSISSIPPI	158	0.8%	30				
MISSOURI	1,025	5.0%	6				
NEW HAMPSHIRE	78	0.4%	38				
NEW JERSEY	183	0.9%	25				
NEW YORK	589	2.9%	13				
NORTH CAROLINA	430	2.1%	17				
OHIO	2,294	11.1%	1				
PENNSYLVANIA	1,356	6.6%	3				
RHODE ISLAND	8	0.0%	47				
SOUTH CAROLINA	223	1.1%	23				
TENNESSEE	879	4.3%	9				
VERMONT	5	0.0%	49				
VIRGINIA	280	1.4%	21				
WEST VIRGINIA	987	4.8%	8				
WISCONSIN	454	2.2%	16				
EASTERN SUBTOTAL:	17,172	83.3%		WESTERN SUBTOTAL:	3,439	16.7%	

UNITED STATES SO₂ TOTAL: 20,611 kilotonnes

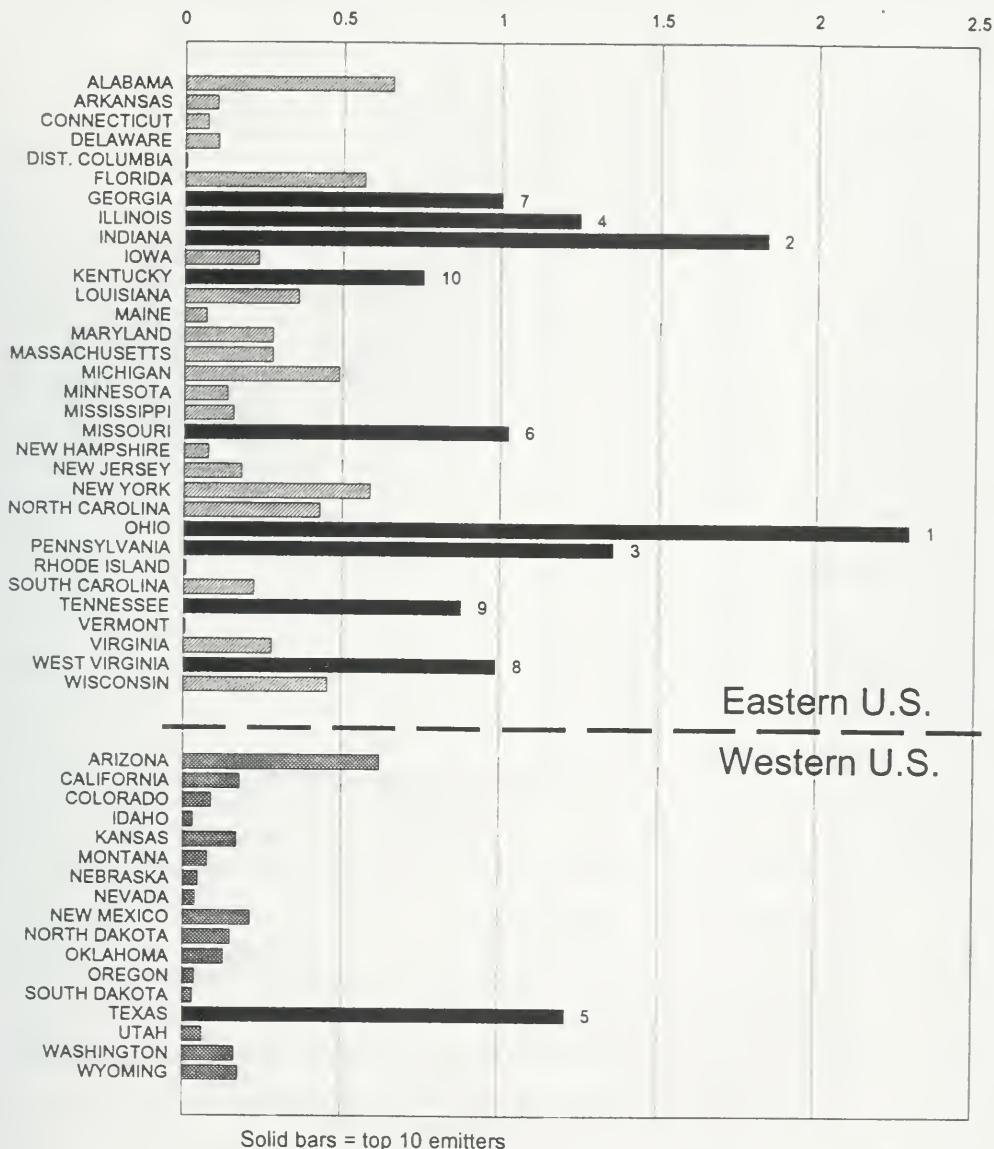
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original database. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1985 SO₂ emission total of 21.07 million tonnes (or 23.23 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1985.

Figure C-6. UNITED STATES 1985 SO₂ EMISSIONS BY STATE
 (Million Tonnes)



Solid bars = top 10 emitters

**Table C-7. UNITED STATES 1985 NO_x EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	NO _x (kt*)	% of U.S.	Rank	WESTERN STATES	NO _x (kt*)	% of U.S.	Rank
ALABAMA	467	2.3%	16	ARIZONA	296	1.4%	25
ARKANSAS	225	1.1%	34	CALIFORNIA	1,421	6.9%	2
CONNECTICUT	148	0.7%	39	COLORADO	290	1.4%	27
DELAWARE	65	0.3%	45	IDAHO	83	0.4%	42
DIST. COLUMBIA	19	0.1%	49	KANSAS	376	1.8%	22
FLORIDA	734	3.6%	7	MONTANA	122	0.6%	40
GEORGIA	655	3.2%	11	NEBRASKA	157	0.8%	37
ILLINOIS	933	4.5%	4	NEVADA	90	0.4%	41
INDIANA	796	3.8%	6	NEW MEXICO	258	1.2%	31
IOWA	247	1.2%	33	NORTH DAKOTA	151	0.7%	38
KENTUCKY	523	2.5%	12	OKLAHOMA	441	2.1%	17
LOUISIANA	721	3.5%	8	OREGON	183	0.9%	35
MAINE	69	0.3%	43	SOUTH DAKOTA	62	0.3%	46
MARYLAND	282	1.4%	28	TEXAS	2,443	11.8%	1
MASSACHUSETTS	308	1.5%	24	UTAH	159	0.8%	36
MICHIGAN	697	3.4%	10	WASHINGTON	294	1.4%	26
MINNESOTA	322	1.6%	23	WYOMING	252	1.2%	32
MISSISSIPPI	262	1.3%	29				
MISSOURI	509	2.5%	13				
NEW HAMPSHIRE	67	0.3%	44				
NEW JERSEY	393	1.9%	21				
NEW YORK	702	3.4%	9				
NORTH CAROLINA	503	2.4%	14				
OHIO	1,004	4.9%	3				
PENNSYLVANIA	898	4.3%	5				
RHODE ISLAND	31	0.2%	47				
SOUTH CAROLINA	259	1.3%	30				
TENNESSEE	487	2.4%	15				
VERMONT	27	0.1%	48				
VIRGINIA	408	2.0%	19				
WEST VIRGINIA	440	2.1%	18				
WISCONSIN	397	1.9%	20				
EASTERN SUBTOTAL:	13,598	65.8%		WESTERN SUBTOTAL:	7,080	34.2%	

UNITED STATES NO_x TOTAL: 20,678 kilotonnes

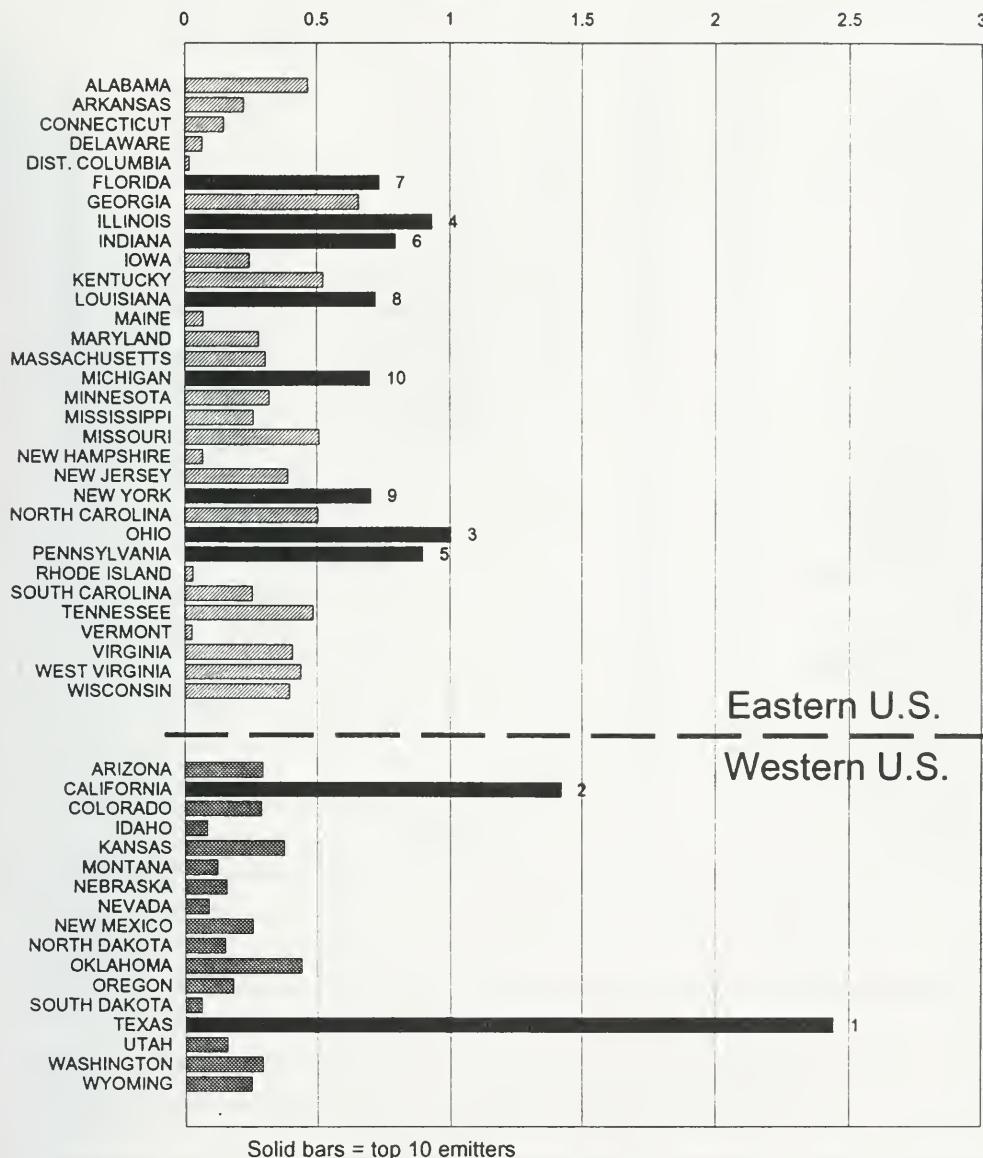
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original database. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1985 NO_x emission total of 20.74 million tonnes (or 22.86 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1985

Figure C-7. UNITED STATES 1985 NO_x EMISSIONS BY STATE
 (Million Tonnes)



**Table C-8. UNITED STATES 1985 VOC EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	VOC (kt*)	% of U.S.	Rank	WESTERN STATES	VOC (kt*)	% of U.S.	Rank
ALABAMA	578	2.5%	16	ARIZONA	225	1.0%	33
ARKANSAS	226	1.0%	32	CALIFORNIA	1,832	8.0%	2
CONNECTICUT	214	0.9%	34	COLORADO	269	1.2%	28
DELAWARE	78	0.3%	43	IDAHO	141	0.6%	36
DIST. COLUMBIA	30	0.1%	49	KANSAS	238	1.0%	30
FLORIDA	902	3.9%	7	MONTANA	96	0.4%	39
GEORGIA	625	2.7%	13	NEBRASKA	133	0.6%	38
ILLINOIS	1,004	4.4%	4	NEVADA	76	0.3%	44
INDIANA	592	2.6%	15	NEW MEXICO	140	0.6%	37
IOWA	235	1.0%	31	NORTH DAKOTA	81	0.4%	42
KENTUCKY	356	1.5%	24	OKLAHOMA	335	1.5%	25
LOUISIANA	672	2.9%	10	OREGON	249	1.1%	29
MAINE	87	0.4%	40	SOUTH DAKOTA	85	0.4%	41
MARYLAND	300	1.3%	27	TEXAS	2,985	13.0%	1
MASSACHUSETTS	437	1.9%	21	UTAH	141	0.6%	35
MICHIGAN	789	3.4%	8	WASHINGTON	363	1.6%	23
MINNESOTA	394	1.7%	22	WYOMING	62	0.3%	47
MISSISSIPPI	309	1.3%	26				
MISSOURI	493	2.1%	19				
NEW HAMPSHIRE	73	0.3%	45				
NEW JERSEY	632	2.7%	11				
NEW YORK	1,048	4.6%	3				
NORTH CAROLINA	705	3.1%	9				
OHIO	904	3.9%	6				
PENNSYLVANIA	941	4.1%	5				
RHODE ISLAND	72	0.3%	46				
SOUTH CAROLINA	631	2.7%	12				
TENNESSEE	554	2.4%	17				
VERMONT	41	0.2%	48				
VIRGINIA	616	2.7%	14				
WEST VIRGINIA	547	2.4%	18				
WISCONSIN	467	2.0%	20				
EASTERN SUBTOTAL:	15,555	67.6%		WESTERN SUBTOTAL:	7,452	32.4%	
UNITED STATES VOC TOTAL: 23,007 kilotonnes							

* kt = kilotonnes or thousand tonnes (gigagrams)

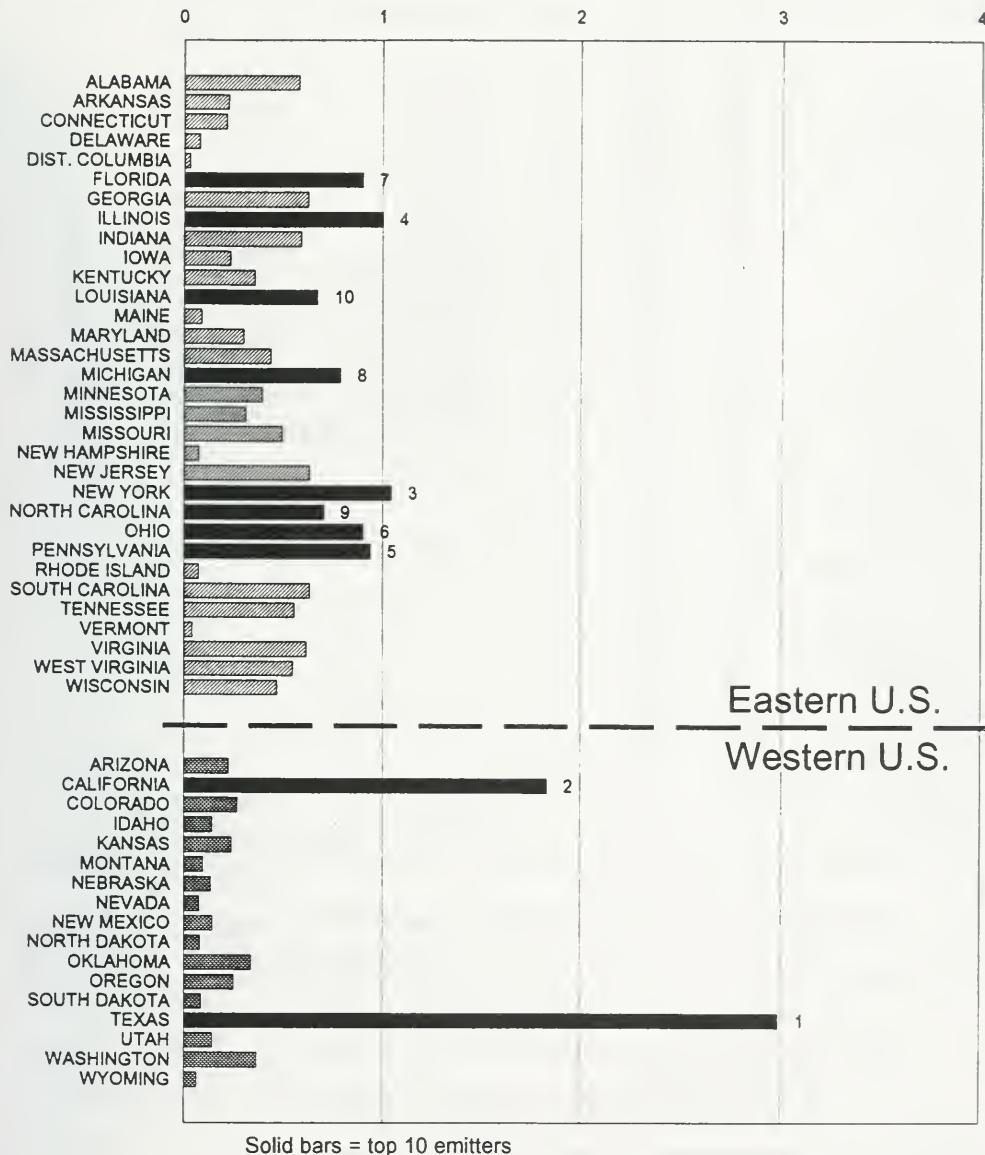
Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original database. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1985 VOC emission total of 23.40 million tonnes (or 25.80 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1985.

Figure C-8. UNITED STATES 1985 VOC EMISSIONS BY STATE

(Million Tonnes)



Solid bars = top 10 emitters

**Table C-9. UNITED STATES 1985 PM10 EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	PM10 (kt*)	% of U.S.	Rank	WESTERN STATES	PM10 (kt*)	% of U.S.	Rank
ALABAMA	731	1.7%	20	ARIZONA	477	1.1%	33
ARKANSAS	556	1.3%	29	CALIFORNIA	2,310	5.4%	4
CONNECTICUT	219	0.5%	41	COLORADO	642	1.5%	24
DELAWARE	60	0.1%	48	IDAHO	422	1.0%	36
DIST. COLUMBIA	10	0.0%	49	KANSAS	1,733	4.1%	5
FLORIDA	1,209	2.8%	11	MONTANA	413	1.0%	37
GEORGIA	1,269	3.0%	9	NEBRASKA	879	2.1%	15
ILLINOIS	1,469	3.4%	7	NEVADA	109	0.3%	44
INDIANA	790	1.9%	18	NEW MEXICO	2,558	6.0%	2
IOWA	834	2.0%	16	NORTH DAKOTA	687	1.6%	22
KENTUCKY	492	1.2%	32	OKLAHOMA	2,514	5.9%	3
LOUISIANA	626	1.5%	26	OREGON	632	1.5%	25
MAINE	116	0.3%	43	SOUTH DAKOTA	432	1.0%	35
MARYLAND	344	0.8%	38	TEXAS	6,157	14.5%	1
MASSACHUSETTS	559	1.3%	28	UTAH	325	0.8%	39
MICHIGAN	924	2.2%	14	WASHINGTON	791	1.9%	17
MINNESOTA	1,198	2.8%	12	WYOMING	227	0.5%	40
MISSISSIPPI	715	1.7%	21				
MISSOURI	1,559	3.7%	6				
NEW HAMPSHIRE	96	0.2%	46				
NEW JERSEY	432	1.0%	34				
NEW YORK	1,234	2.9%	10				
NORTH CAROLINA	649	1.5%	23				
OHIO	1,335	3.1%	8				
PENNSYLVANIA	1,077	2.5%	13				
RHODE ISLAND	82	0.2%	47				
SOUTH CAROLINA	493	1.2%	31				
TENNESSEE	603	1.4%	27				
VERMONT	100	0.2%	45				
VIRGINIA	533	1.3%	30				
WEST VIRGINIA	207	0.5%	42				
WISCONSIN	763	1.8%	19				
EASTERN SUBTOTAL:	21,283	50.0%		WESTERN SUBTOTAL:	21,309	50.0%	
UNITED STATES PM10 TOTAL: 42,592 kilotonnes							

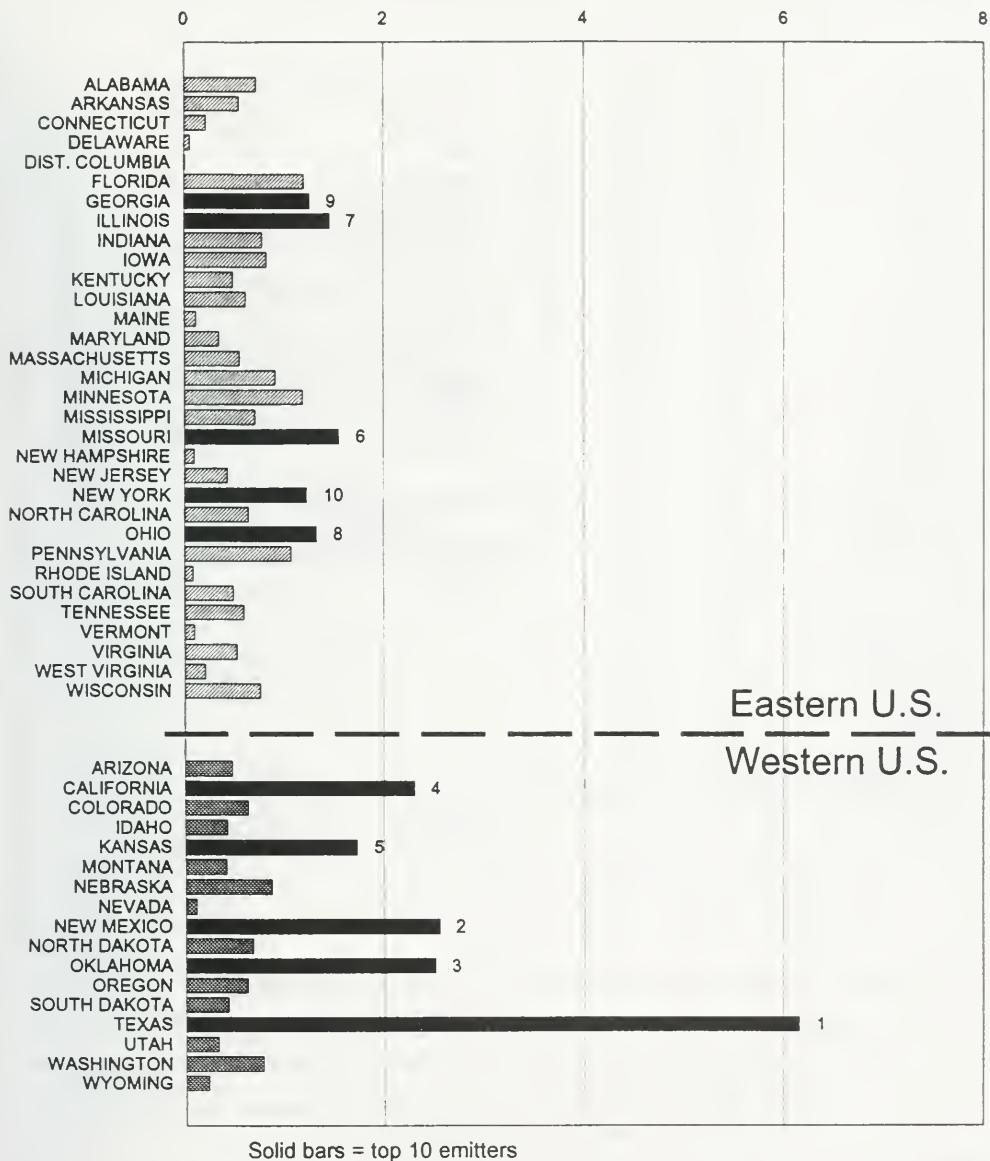
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original database. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1985 PM10 emission total of 40.81 million tonnes (or 44.98 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1985

Figure C-9. UNITED STATES 1985 PM10 EMISSIONS BY STATE
 (Million Tonnes)



**Table C-10. UNITED STATES 1985 CO EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	CO (kt*)	% of U.S.	Rank	WESTERN STATES	CO (kt*)	% of U.S.	Rank
ALABAMA	2,359	2.3%	16	ARIZONA	1,389	1.4%	28
ARKANSAS	1,010	1.0%	35	CALIFORNIA	8,912	8.8%	1
CONNECTICUT	1,075	1.1%	31	COLORADO	1,975	2.0%	21
DELAWARE	300	0.3%	46	IDAHO	1,093	1.1%	30
DIST. COLUMBIA	157	0.2%	49	KANSAS	1,035	1.0%	34
FLORIDA	4,853	4.8%	3	MONTANA	700	0.7%	38
GEORGIA	3,484	3.4%	9	NEBRASKA	612	0.6%	39
ILLINOIS	4,055	4.0%	7	NEVADA	550	0.5%	40
INDIANA	2,832	2.8%	10	NEW MEXICO	1,043	1.0%	33
IOWA	1,061	1.0%	32	NORTH DAKOTA	305	0.3%	45
KENTUCKY	1,616	1.6%	24	OKLAHOMA	1,583	1.6%	26
LOUISIANA	2,536	2.5%	12	OREGON	1,748	1.7%	23
MAINE	505	0.5%	41	SOUTH DAKOTA	443	0.4%	42
MARYLAND	1,595	1.6%	25	TEXAS	8,092	8.0%	2
MASSACHUSETTS	2,124	2.1%	19	UTAH	1,008	1.0%	36
MICHIGAN	3,802	3.8%	8	WASHINGTON	2,498	2.5%	13
MINNESOTA	1,950	1.9%	22	WYOMING	363	0.4%	44
MISSISSIPPI	1,376	1.4%	29				
MISSOURI	2,313	2.3%	17				
NEW HAMPSHIRE	396	0.4%	43	ALASKA	0	0.0%	50
NEW JERSEY	2,457	2.4%	15	HAWAII	0	0.0%	51
NEW YORK	4,653	4.6%	4				
NORTH CAROLINA	2,821	2.8%	11				
OHIO	4,286	4.2%	6				
PENNSYLVANIA	4,407	4.4%	5				
RHODE ISLAND	299	0.3%	47				
SOUTH CAROLINA	1,506	1.5%	27				
TENNESSEE	2,224	2.2%	18				
VERMONT	251	0.2%	48				
VIRGINIA	2,488	2.5%	14				
WEST VIRGINIA	996	1.0%	37				
WISCONSIN	2,099	2.1%	20				
EASTERN SUBTOTAL:	67,886	67.1%		WESTERN SUBTOTAL:	33,350	32.9%	
UNITED STATES CO TOTAL: 101,236 kilotonnes							

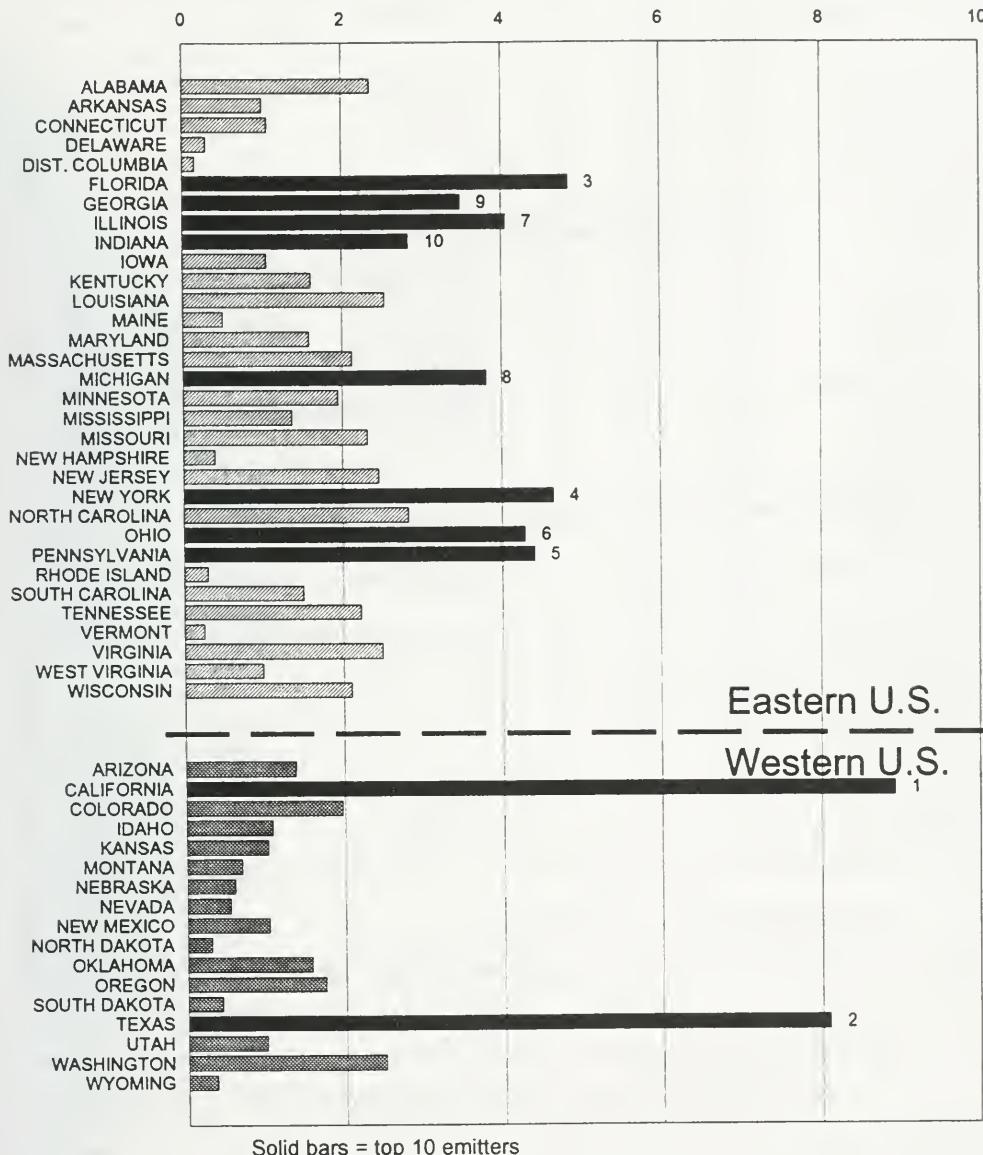
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original database. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1985 CO emission total of 104.05 million tonnes (or 114.69 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1985.

Figure C-10. UNITED STATES 1985 CO EMISSIONS BY STATE
 (Million Tonnes)



**Table C-11. UNITED STATES 1990 SO₂ EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	SO ₂ (kt*)	% of U.S.	Rank	WESTERN STATES	SO ₂ (kt*)	% of U.S.	Rank
ALABAMA	678	3.3%	12	ARIZONA	510	2.5%	14
ARKANSAS	101	0.5%	34	CALIFORNIA	203	1.0%	26
CONNECTICUT	75	0.4%	38	COLORADO	97	0.5%	35
DELAWARE	91	0.4%	36	IDAHO	33	0.2%	46
DIST. COLUMBIA	7	0.0%	49	KANSAS	122	0.6%	33
FLORIDA	697	3.4%	11	MONTANA	70	0.3%	40
GEORGIA	897	4.4%	8	NEBRASKA	60	0.3%	42
ILLINOIS	1,147	5.6%	4	NEVADA	58	0.3%	43
INDIANA	1,797	8.8%	2	NEW MEXICO	.232	1.1%	24
IOWA	252	1.2%	22	NORTH DAKOTA	178	0.9%	27
KENTUCKY	922	4.5%	7	OKLAHOMA	138	0.7%	30
LOUISIANA	366	1.8%	18	OREGON	42	0.2%	44
MAINE	75	0.4%	37	SOUTH DAKOTA	35	0.2%	45
MARYLAND	340	1.7%	19	TEXAS	1,124	5.5%	5
MASSACHUSETTS	273	1.3%	21	UTAH	68	0.3%	41
MICHIGAN	474	2.3%	15	WASHINGTON	145	0.7%	29
MINNESOTA	130	0.6%	31	WYOMING	127	0.6%	32
MISSISSIPPI	230	1.1%	25				
MISSOURI	885	4.3%	10				
NEW HAMPSHIRE	75	0.4%	39				
NEW JERSEY	165	0.8%	28				
NEW YORK	611	3.0%	13				
NORTH CAROLINA	444	2.2%	16	ALASKA	2	0.0%	51
OHIO	2,358	11.5%	1	HAWAII	26	0.1%	47
PENNSYLVANIA	1,306	6.4%	3				
RHODE ISLAND	7	0.0%	48				
SOUTH CAROLINA	238	1.2%	23				
TENNESSEE	888	4.3%	9				
VERMONT	5	0.0%	50				
VIRGINIA	312	1.5%	20				
WEST VIRGINIA	988	4.8%	6				
WISCONSIN	385	1.9%	17				
EASTERN SUBTOTAL:	17,217	84.0%		WESTERN SUBTOTAL:	3,271	16.0%	
UNITED STATES SO ₂ TOTAL: 20,488 kilotonnes							

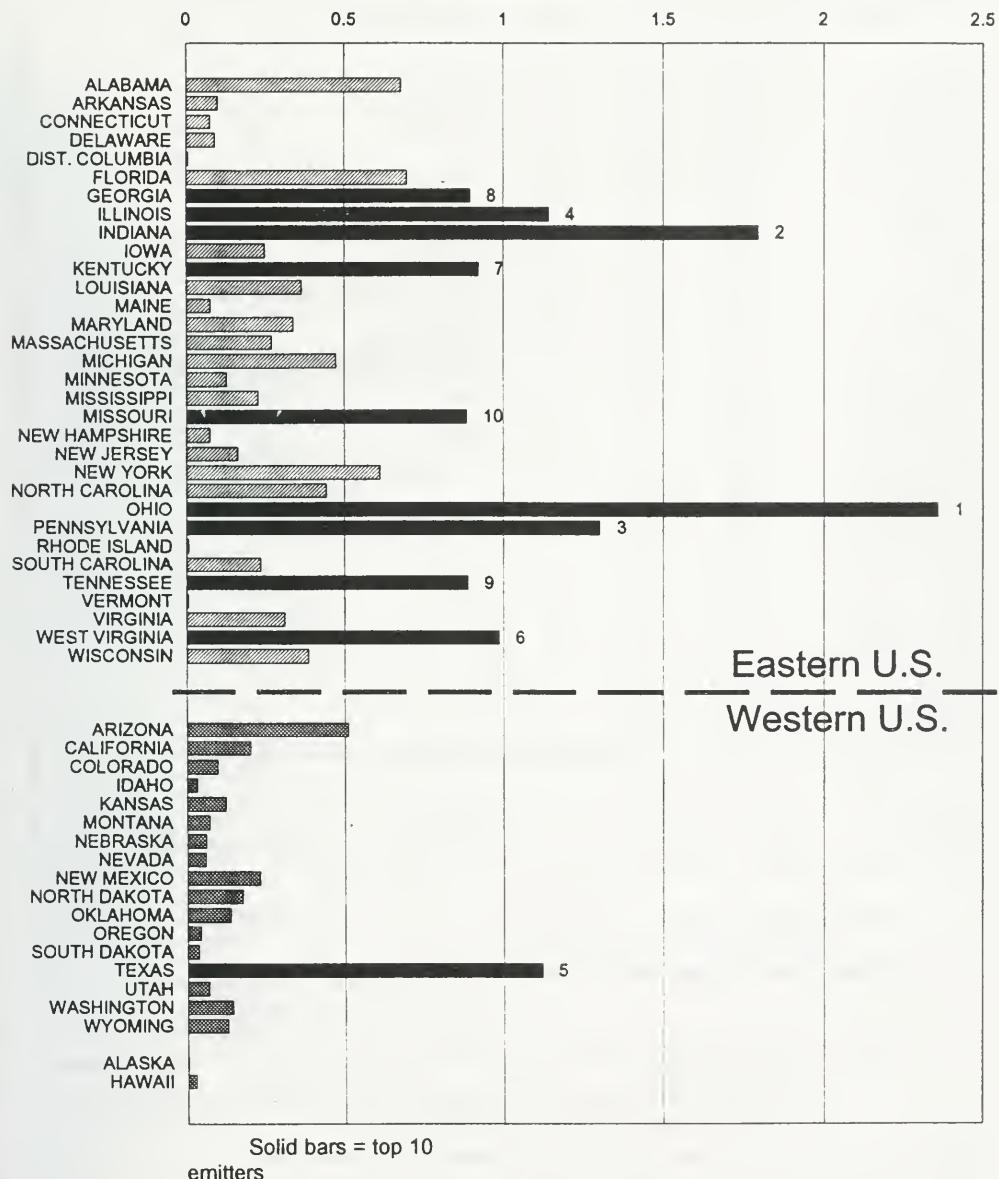
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original dataset. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1990 SO₂ emission total of 20.35 million tonnes (or 22.44 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1990.

Figure C-11. UNITED STATES 1990 SO₂ EMISSIONS BY STATE
(Million Tonnes)



**Table C-12. UNITED STATES 1990 NO_x EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	NO _x (kt*)	% of U.S.	Rank	WESTERN STATES	NO _x (kt*)	% of U.S.	Rank
ALABAMA	474	2.3%	16	ARIZONA	321	1.5%	24
ARKANSAS	226	1.1%	34	CALIFORNIA	1,364	6.6%	2
CONNECTICUT	140	0.7%	39	COLORADO	290	1.4%	28
DELAWARE	60	0.3%	45	IDAHO	84	0.4%	42
DIST. COLUMBIA	18	0.1%	50	KANSAS	371	1.8%	21
FLORIDA	792	3.8%	7	MONTANA	136	0.7%	40
GEORGIA	608	2.9%	11	NEBRASKA	171	0.8%	37
ILLINOIS	863	4.2%	5	NEVADA	115	0.6%	41
INDIANA	879	4.2%	4	NEW MEXICO	256	1.2%	33
IOWA	265	1.3%	32	NORTH DAKOTA	161	0.8%	38
KENTUCKY	561	2.7%	12	OKLAHOMA	401	1.9%	19
LOUISIANA	692	3.3%	10	OREGON	189	0.9%	36
MAINE	71	0.3%	43	SOUTH DAKOTA	59	0.3%	46
MARYLAND	295	1.4%	27	TEXAS	2,309	11.1%	1
MASSACHUSETTS	297	1.4%	26	UTAH	201	1.0%	35
MICHIGAN	713	3.4%	9	WASHINGTON	312	1.5%	25
MINNESOTA	361	1.7%	23	WYOMING	266	1.3%	31
MISSISSIPPI	274	1.3%	30				
MISSOURI	536	2.6%	13				
NEW HAMPSHIRE	68	0.3%	44	ALASKA	18	0.1%	51
NEW JERSEY	363	1.7%	22	HAWAII	37	0.2%	47
NEW YORK	718	3.5%	8				
NORTH CAROLINA	492	2.4%	15				
OHIO	1,004	4.8%	3				
PENNSYLVANIA	855	4.1%	6				
RHODE ISLAND	33	0.2%	48				
SOUTH CAROLINA	278	1.3%	29				
TENNESSEE	501	2.4%	14				
VERMONT	26	0.1%	49				
VIRGINIA	419	2.0%	18				
WEST VIRGINIA	423	2.0%	17				
WISCONSIN	398	1.9%	20				
EASTERN SUBTOTAL:	13,706	66.0%		WESTERN SUBTOTAL:	7,059	34.0%	
UNITED STATES NO _x TOTAL: 20,766 kilotonnes							

* kt = kilotonnes or thousand tonnes (gigagrams)

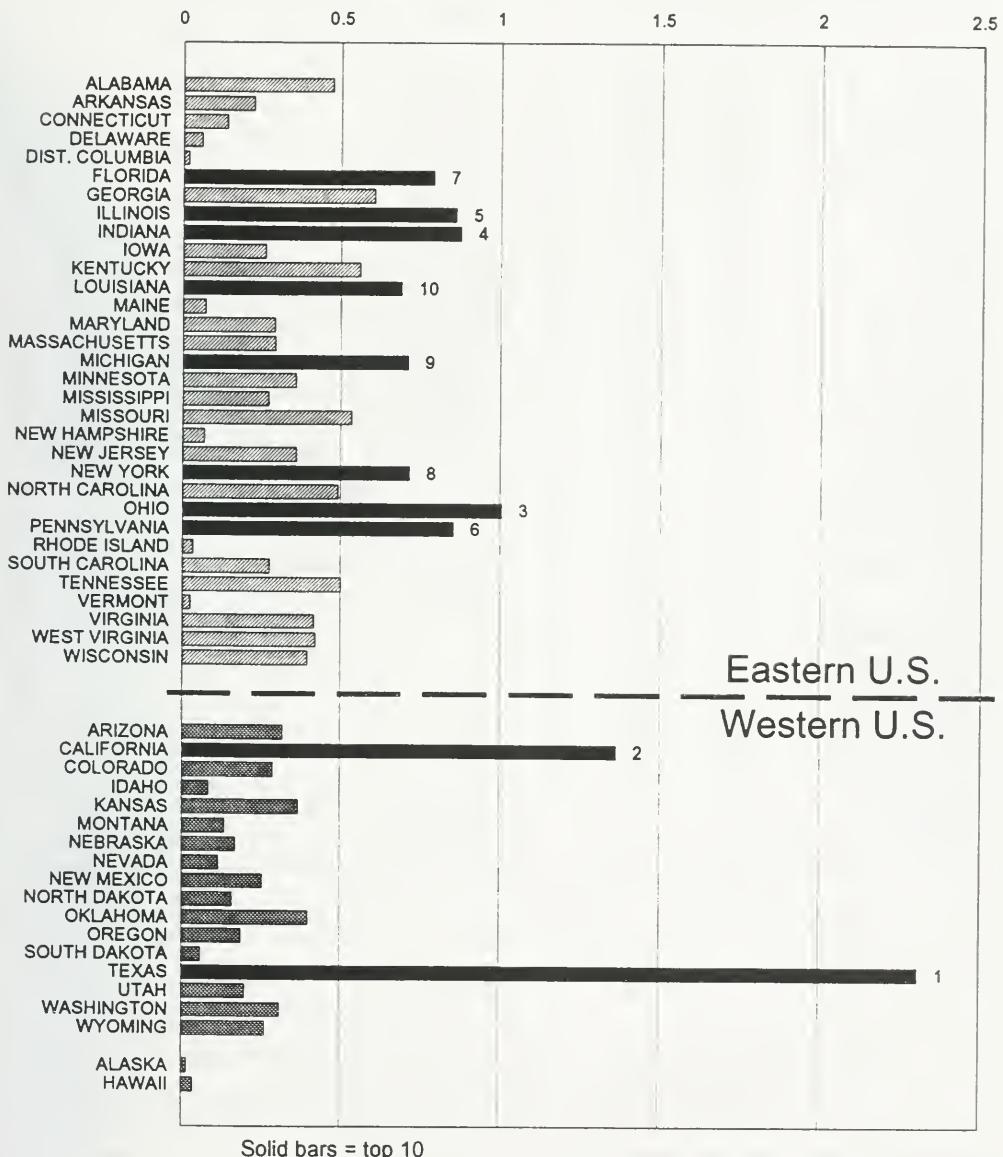
Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original database. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1990 NO_x emission total of 20.90 million tonnes (or 23.04 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1990.

Figure C-12. UNITED STATES 1990 NOx EMISSIONS BY STATE

(Million Tonnes)



Solid bars = top 10

Eastern U.S.

Western U.S.

**Table C-13. UNITED STATES 1990 VOC EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	VOC (kt*)	% of U.S.	Rank	WESTERN STATES	VOC (kt*)	% of U.S.	Rank
ALABAMA	445	2.2%	18	ARIZONA	244	1.2%	28
ARKANSAS	214	1.0%	30	CALIFORNIA	1,743	8.5%	2
CONNECTICUT	180	0.9%	34	COLORADO	210	1.0%	32
DELAWARE	106	0.5%	39	IDAHO	136	0.7%	35
DIST. COLUMBIA	23	0.1%	50	KANSAS	211	1.0%	31
FLORIDA	818	4.0%	6	MONTANA	90	0.4%	40
GEORGIA	607	3.0%	11	NEBRASKA	120	0.6%	37
ILLINOIS	829	4.0%	4	NEVADA	76	0.4%	43
INDIANA	539	2.6%	14	NEW MEXICO	121	0.6%	36
IOWA	210	1.0%	33	NORTH DAKOTA	69	0.3%	44
KENTUCKY	316	1.5%	24	OKLAHOMA	264	1.3%	26
LOUISIANA	600	2.9%	12	OREGON	218	1.1%	29
MAINE	81	0.4%	41	SOUTH DAKOTA	81	0.4%	42
MARYLAND	260	1.3%	27	TEXAS	2,443	11.9%	1
MASSACHUSETTS	371	1.8%	21	UTAH	119	0.6%	38
MICHIGAN	685	3.3%	9	WASHINGTON	368	1.8%	22
MINNESOTA	366	1.8%	23	WYOMING	54	0.3%	47
MISSISSIPPI	296	1.4%	25				
MISSOURI	435	2.1%	19				
NEW HAMPSHIRE	67	0.3%	45				
NEW JERSEY	551	2.7%	13	ALASKA	13	0.1%	51
NEW YORK	908	4.4%	3	HAWAII	27	0.1%	49
NORTH CAROLINA	717	3.5%	8				
OHIO	803	3.9%	7				
PENNSYLVANIA	820	4.0%	5				
RHODE ISLAND	64	0.3%	46				
SOUTH CAROLINA	643	3.1%	10				
TENNESSEE	532	2.6%	16				
VERMONT	38	0.2%	48				
VIRGINIA	533	2.6%	15				
WEST VIRGINIA	512	2.5%	17				
WISCONSIN	384	1.9%	20				
EASTERN SUBTOTAL:	13,954	67.9%		WESTERN SUBTOTAL:	6,611	32.1%	
UNITED STATES VOC TOTAL: 20,565 kilotonnes							

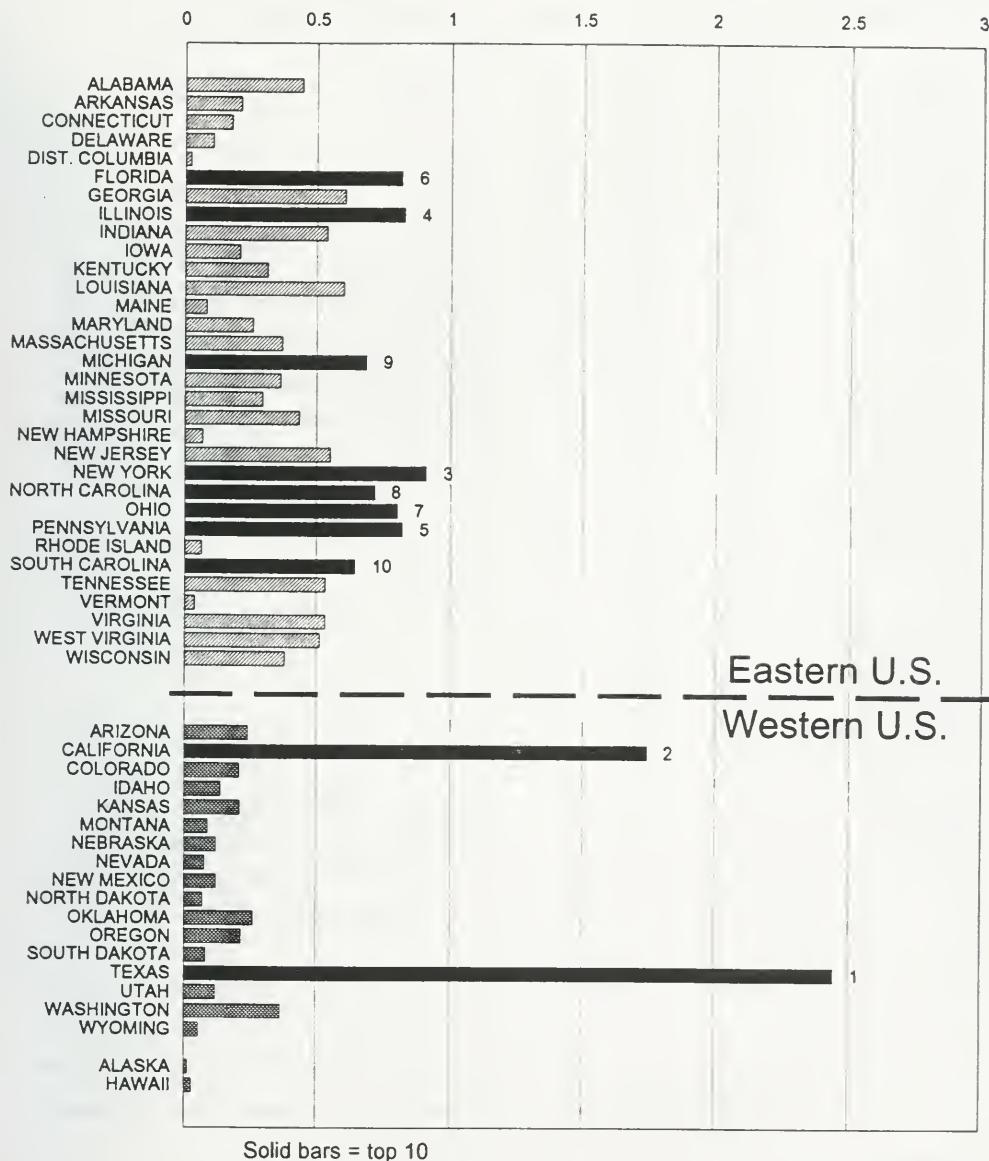
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original database. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1990 VOC emission total of 21.41 million tonnes (or 23.60 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1990.

Figure C-13. UNITED STATES 1990 VOC EMISSIONS BY STATE
 (Million Tonnes)



Solid bars = top 10

**Table C-14. UNITED STATES 1990 PM10 EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	PM10 (kt*)	% of U.S.	Rank	WESTERN STATES	PM10 (kt*)	% of U.S.	Rank
ALABAMA	766	1.8%	20	ARIZONA	425	1.0%	37
ARKANSAS	587	1.3%	30	CALIFORNIA	2,517	5.8%	2
CONNECTICUT	228	0.5%	41	COLORADO	595	1.4%	29
DELAWARE	64	0.1%	48	IDAHO	466	1.1%	35
DIST. COLUMBIA	10	0.0%	49	KANSAS	1,694	3.9%	5
FLORIDA	1,209	2.8%	12	MONTANA	630	1.4%	24
GEORGIA	1,287	2.9%	11	NEBRASKA	908	2.1%	16
ILLINOIS	1,458	3.3%	7	NEVADA	155	0.4%	43
INDIANA	855	2.0%	18	NEW MEXICO	2,474	5.7%	3
IOWA	890	2.0%	17	NORTH DAKOTA	604	1.4%	27
KENTUCKY	511	1.2%	34	OKLAHOMA	2,373	5.4%	4
LOUISIANA	621	1.4%	25	OREGON	701	1.6%	22
MAINE	126	0.3%	44	SOUTH DAKOTA	543	1.2%	32
MARYLAND	404	0.9%	38	TEXAS	5,918	13.5%	1
MASSACHUSETTS	565	1.3%	31	UTAH	314	0.7%	39
MICHIGAN	983	2.2%	14	WASHINGTON	920	2.1%	15
MINNESOTA	1,288	2.9%	10	WYOMING	246	0.6%	40
MISSISSIPPI	734	1.7%	21				
MISSOURI	1,558	3.6%	6				
NEW HAMPSHIRE	94	0.2%	46	ALASKA	0	0.0%	51
NEW JERSEY	461	1.1%	36	HAWAII	1	0.0%	50
NEW YORK	1,316	3.0%	9				
NORTH CAROLINA	700	1.6%	23				
OHIO	1,392	3.2%	8				
PENNSYLVANIA	1,138	2.6%	13				
RHODE ISLAND	88	0.2%	47				
SOUTH CAROLINA	525	1.2%	33				
TENNESSEE	618	1.4%	26				
VERMONT	104	0.2%	45				
VIRGINIA	602	1.4%	28				
WEST VIRGINIA	214	0.5%	42				
WISCONSIN	802	1.8%	19				
EASTERN SUBTOTAL:	22,198	50.8%		WESTERN SUBTOTAL:	21,484	49.2%	

UNITED STATES PM10 TOTAL: 43,682 kilotonnes

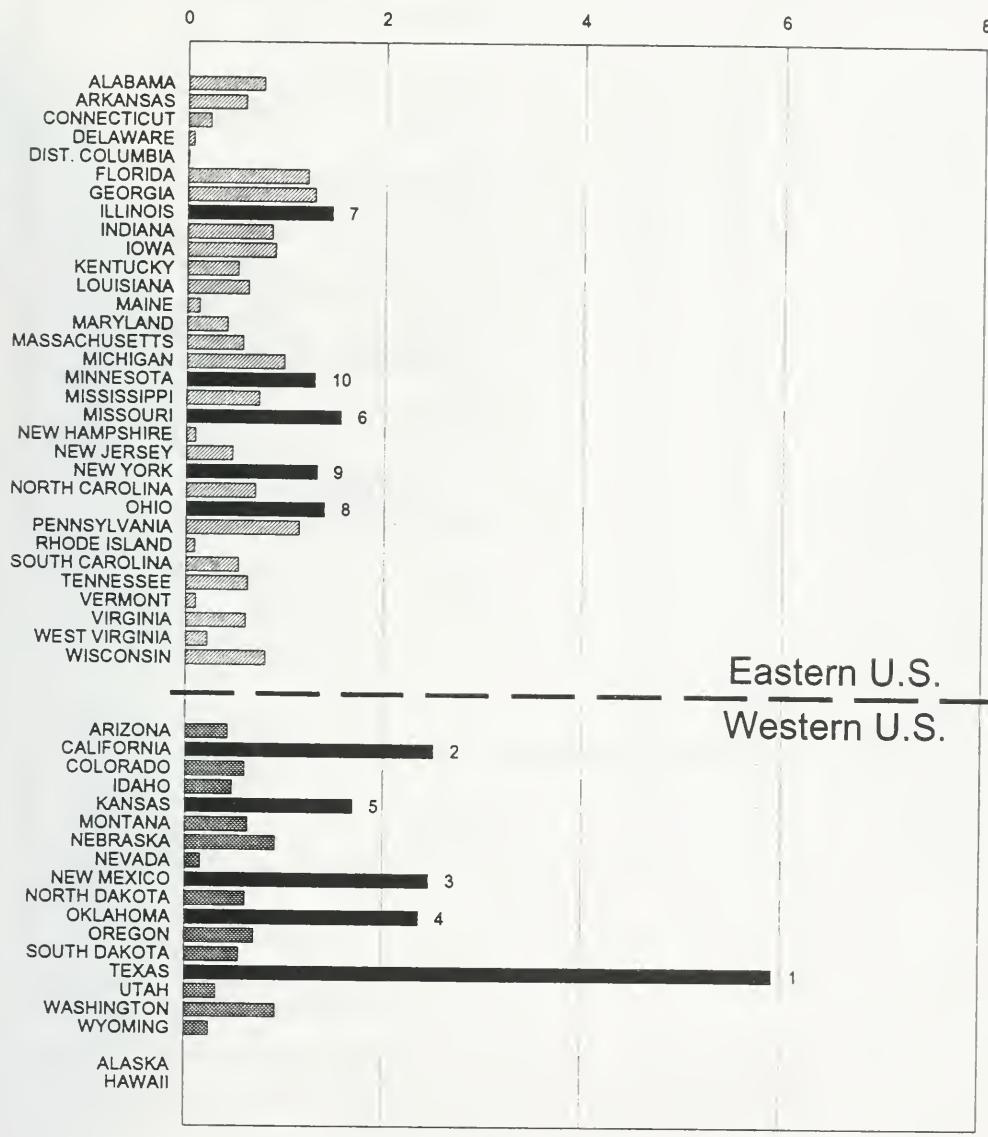
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original dataset. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1990 PM10 emission total of 39.31 million tonnes (or 43.33 million US tons) in the report "National Air Pollutant Emission Trends, 1990 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1990

Figure C-14. UNITED STATES 1990 PM10 EMISSIONS BY STATE
(Million Tonnes)



Solid bars = top 10

**Table C-15. UNITED STATES 1990 CO EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	CO (kt*)	% of U.S.	Rank	WESTERN STATES	CO (kt*)	% of U.S.	Rank
ALABAMA	2,112	2.4%	15	ARIZONA	1,476	1.7%	23
ARKANSAS	924	1.0%	31	CALIFORNIA	8,389	9.5%	1
CONNECTICUT	846	1.0%	35	COLORADO	1,297	1.5%	28
DELAWARE	252	0.3%	46	IDAHO	1,041	1.2%	30
DIST. COLUMBIA	112	0.1%	51	KANSAS	890	1.0%	32
FLORIDA	4,362	4.9%	3	MONTANA	617	0.7%	38
GEORGIA	3,383	3.8%	7	NEBRASKA	519	0.6%	39
ILLINOIS	3,102	3.5%	9	NEVADA	476	0.5%	40
INDIANA	2,527	2.9%	11	NEW MEXICO	821	0.9%	36
IOWA	876	1.0%	34	NORTH DAKOTA	237	0.3%	47
KENTUCKY	1,319	1.5%	25	OKLAHOMA	1,205	1.4%	29
LOUISIANA	2,416	2.7%	12	OREGON	1,642	1.9%	22
MAINE	458	0.5%	41	SOUTH DAKOTA	382	0.4%	42
MARYLAND	1,317	1.5%	26	TEXAS	6,665	7.5%	2
MASSACHUSETTS	1,692	1.9%	20	UTAH	768	0.9%	37
MICHIGAN	3,179	3.6%	8	WASHINGTON	2,412	2.7%	13
MINNESOTA	1,682	1.9%	21	WYOMING	305	0.3%	44
MISSISSIPPI	1,305	1.5%	27				
MISSOURI	2,098	2.4%	16				
NEW HAMPSHIRE	359	0.4%	43	ALASKA	138	0.2%	50
NEW JERSEY	1,995	2.3%	18	HAWAII	205	0.2%	49
NEW YORK	3,871	4.4%	4				
NORTH CAROLINA	2,627	3.0%	10				
OHIO	3,770	4.3%	5				
PENNSYLVANIA	3,535	4.0%	6				
RHODE ISLAND	264	0.3%	45				
SOUTH CAROLINA	1,436	1.6%	24				
TENNESSEE	2,030	2.3%	17				
VERMONT	221	0.3%	48				
VIRGINIA	2,197	2.5%	14				
WEST VIRGINIA	879	1.0%	33				
WISCONSIN	1,731	2.0%	19				
EASTERN SUBTOTAL:	58,877	66.6%		WESTERN SUBTOTAL:	29,486	33.4%	
UNITED STATES CO TOTAL: 88,363 kilotonnes							

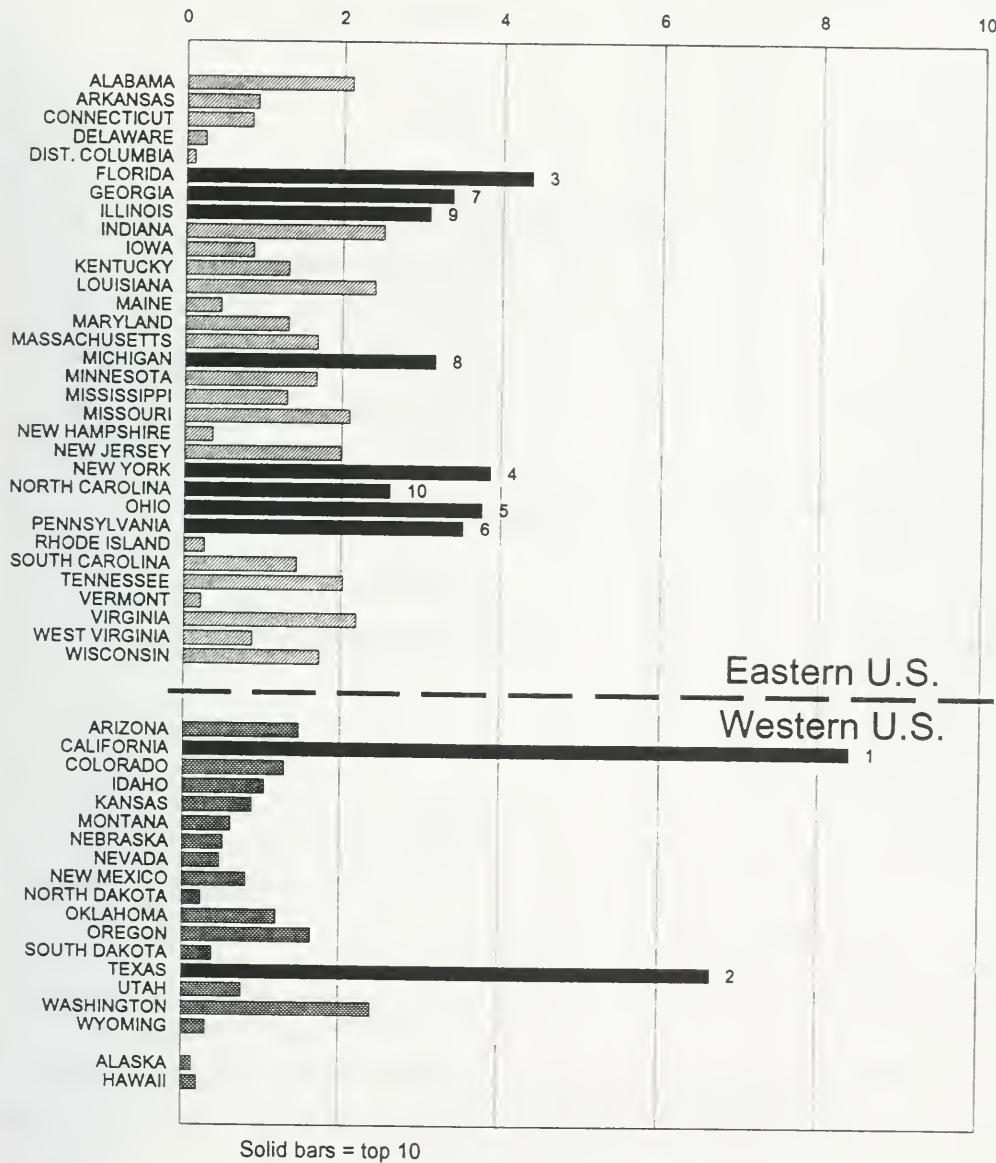
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Inventory 2-Tier Report Generator Database, May 1995, USEPA.
[2] The emissions are reported in US short tons in the original dataset. They are converted to thousand tonnes (gigagrams) by multiplying 0.0009072.

Remark:

The USEPA has published an updated 1990 CO emission total of 91.31 million tonnes (or 100.65 million US tons) in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995, however, the data presented in this table is the latest available state breakdown for 1990.

Figure C-15. UNITED STATES 1990 CO EMISSIONS BY STATE
 (Million Tonnes)



**Table C-16. UNITED STATES 1994 SO₂ EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	SO ₂ (kt*)	% of U.S.	Rank	WESTERN STATES	SO ₂ (kt*)	% of U.S.	Rank
ALABAMA	671	3.5%	11	ARIZONA	305	1.6%	19
ARKANSAS	98	0.5%	34	CALIFORNIA	185	1.0%	27
CONNECTICUT	50	0.3%	44	COLORADO	96	0.5%	35
DELAWARE	86	0.4%	36	IDAHO	34	0.2%	46
DIST. COLUMBIA	6	0.0%	48	KANSAS	106	0.6%	33
FLORIDA	754	3.9%	9	MONTANA	74	0.4%	37
GEORGIA	719	3.8%	10	NEBRASKA	64	0.3%	40
ILLINOIS	1,078	5.6%	6	NEVADA	57	0.3%	42
INDIANA	1,591	8.3%	2	NEW MEXICO	240	1.3%	22
IOWA	231	1.2%	23	NORTH DAKOTA	194	1.0%	25
KENTUCKY	964	5.0%	7	OKLAHOMA	132	0.7%	30
LOUISIANA	394	2.1%	16	OREGON	50	0.3%	43
MAINE	73	0.4%	38	SOUTH DAKOTA	37	0.2%	45
MARYLAND	329	1.7%	17	TEXAS	1,179	6.2%	4
MASSACHUSETTS	186	1.0%	26	UTAH	71	0.4%	39
MICHIGAN	474	2.5%	14	WASHINGTON	156	0.8%	28
MINNESOTA	130	0.7%	31	WYOMING	120	0.6%	32
MISSISSIPPI	212	1.1%	24				
MISSOURI	650	3.4%	12				
NEW HAMPSHIRE	58	0.3%	41				
NEW JERSEY	148	0.8%	29	ALASKA	2	0.0%	51
NEW YORK	454	2.4%	15	HAWAII	18	0.1%	47
NORTH CAROLINA	486	2.5%	13				
OHIO	2,185	11.4%	1				
PENNSYLVANIA	1,205	6.3%	3				
RHODE ISLAND	5	0.0%	49				
SOUTH CAROLINA	251	1.3%	21				
TENNESSEE	839	4.4%	8				
VERMONT	5	0.0%	50				
VIRGINIA	322	1.7%	18				
WEST VIRGINIA	1,092	5.7%	5				
WISCONSIN	291	1.5%	20				
EASTERN SUBTOTAL:	16,040	83.7%		WESTERN SUBTOTAL:	3,120	16.3%	
UNITED STATES SO ₂ TOTAL: 19,160 kilotonnes							

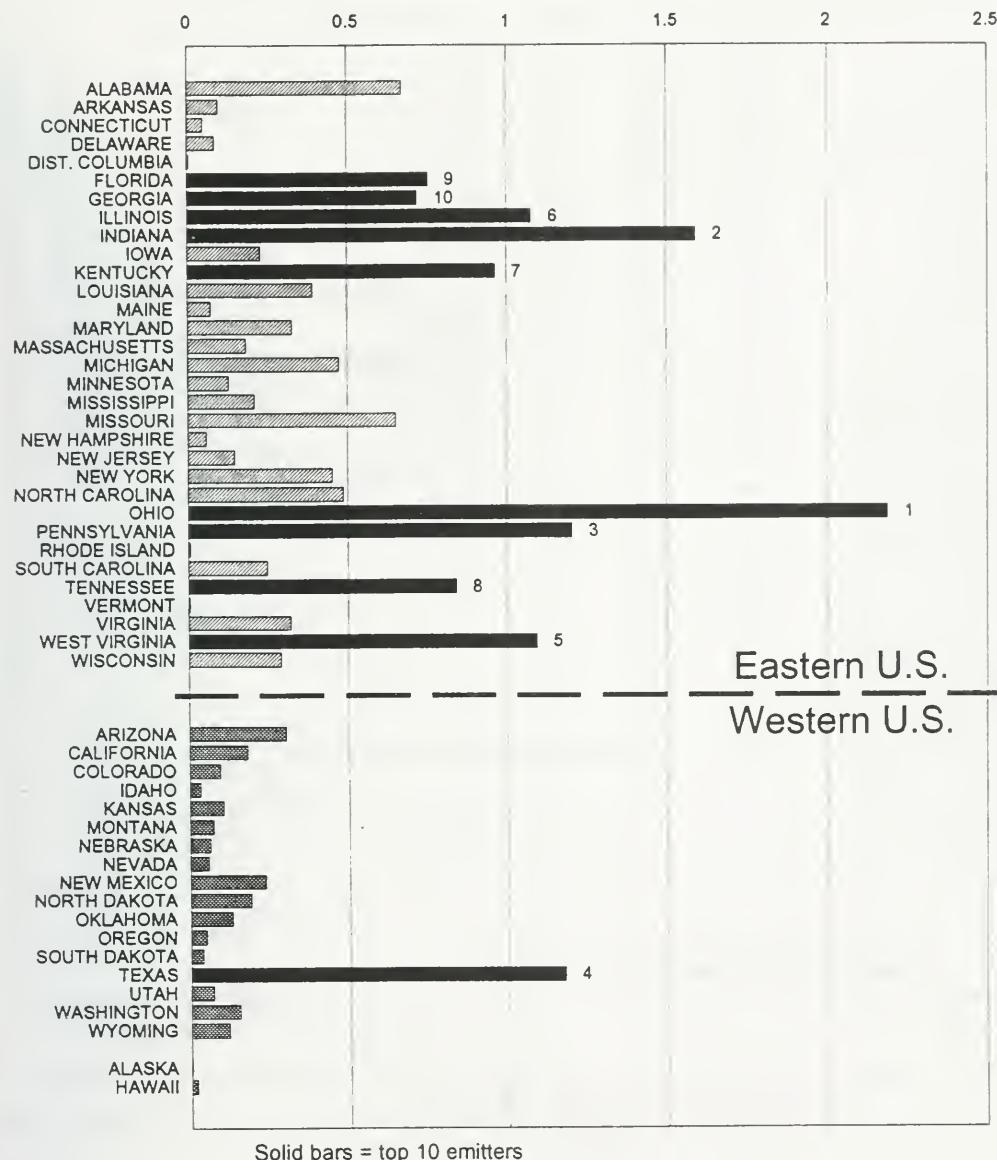
* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994".

EPA-454/R-95-011, October 1995, USEPA.

[2] The emissions are reported in thousand US short tons in the original report. They are converted to thousand tonnes (gigagrams) by multiplying 0.9072.

Figure C-16. UNITED STATES 1994 SO₂ EMISSIONS BY STATE
(Million Tonnes)



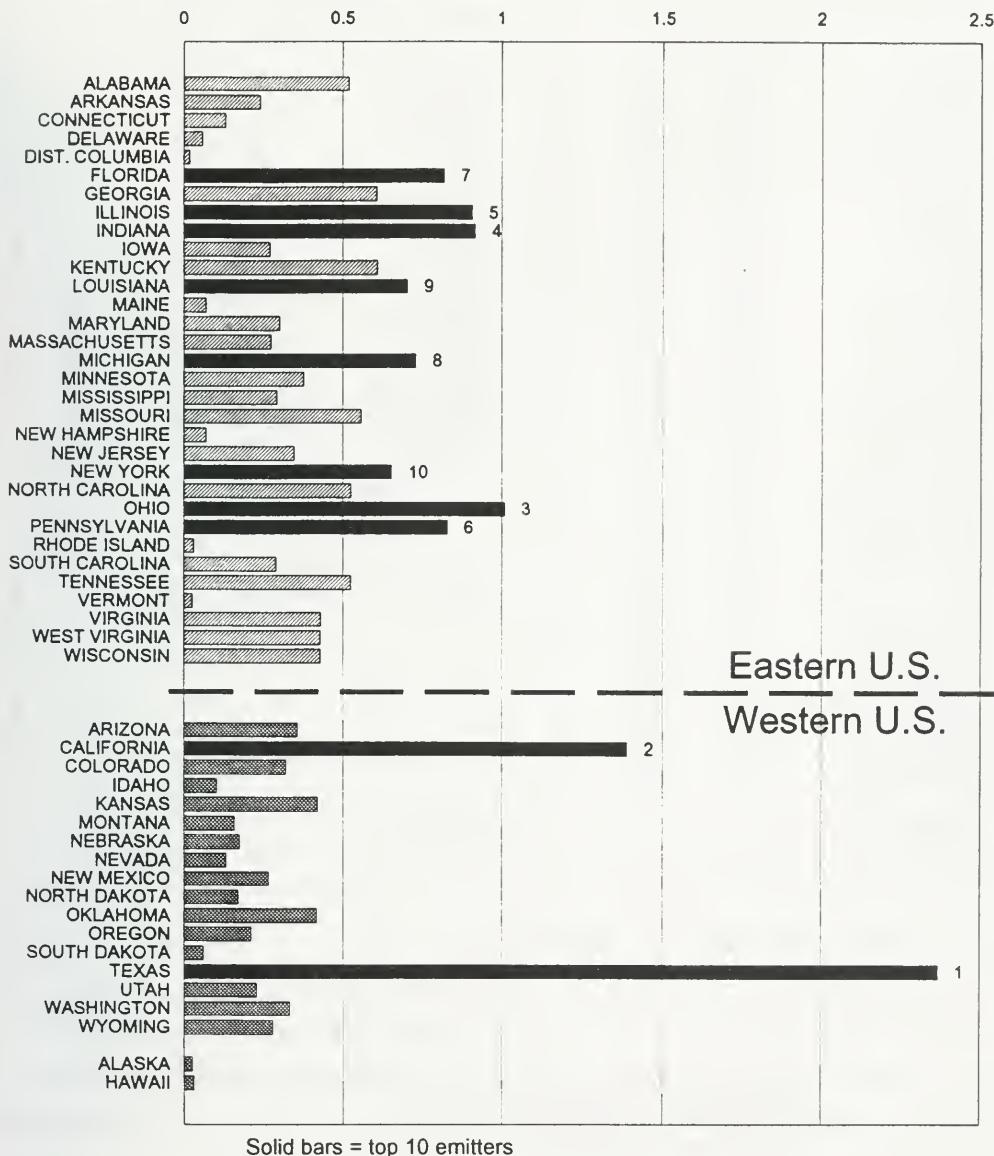
**Table C-17. UNITED STATES 1994 NO_x EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	NO _x (kt*)	% of U.S.	Rank	WESTERN STATES	NO _x (kt*)	% of U.S.	Rank
ALABAMA	521	2.4%	16	ARIZONA	356	1.7%	23
ARKANSAS	239	1.1%	34	CALIFORNIA	1,390	6.5%	2
CONNECTICUT	130	0.6%	41	COLORADO	318	1.5%	26
DELAWARE	57	0.3%	46	IDAHO	100	0.5%	42
DIST. COLUMBIA	18	0.1%	51	KANSAS	420	2.0%	20
FLORIDA	821	3.8%	7	MONTANA	158	0.7%	39
GEORGIA	609	2.8%	12	NEBRASKA	174	0.8%	37
ILLINOIS	908	4.2%	5	NEVADA	130	0.6%	40
INDIANA	917	4.3%	4	NEW MEXICO	264	1.2%	33
IOWA	269	1.3%	32	NORTH DAKOTA	170	0.8%	38
KENTUCKY	610	2.8%	11	OKLAHOMA	417	1.9%	21
LOUISIANA	706	3.3%	9	OREGON	210	1.0%	36
MAINE	68	0.3%	44	SOUTH DAKOTA	60	0.3%	45
MARYLAND	300	1.4%	27	TEXAS	2,369	11.1%	1
MASSACHUSETTS	273	1.3%	31	UTAH	228	1.1%	35
MICHIGAN	731	3.4%	8	WASHINGTON	331	1.5%	25
MINNESOTA	377	1.8%	22	WYOMING	279	1.3%	30
MISSISSIPPI	291	1.4%	28				
MISSOURI	559	2.6%	13				
NEW HAMPSHIRE	68	0.3%	43				
NEW JERSEY	346	1.6%	24	ALASKA	25	0.1%	49
NEW YORK	655	3.1%	10	HAWAII	31	0.1%	47
NORTH CAROLINA	527	2.5%	14				
OHIO	1,008	4.7%	3				
PENNSYLVANIA	830	3.9%	6				
RHODE ISLAND	30	0.1%	48				
SOUTH CAROLINA	288	1.3%	29				
TENNESSEE	525	2.5%	15				
VERMONT	25	0.1%	50				
VIRGINIA	431	2.0%	17				
WEST VIRGINIA	429	2.0%	19				
WISCONSIN	429	2.0%	18				
EASTERN SUBTOTAL:		13,995	65.3%	WESTERN SUBTOTAL:		7,429	34.7%
UNITED STATES NO _x TOTAL: 21,424 kilotonnes							

* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994*,
EPA-454/R-95-011, October 1995, USEPA.
[2] The emissions are reported in thousand US short tons in the original report. They are converted to
thousand tonnes (gigagrams) by multiplying 0.9072.

Figure C-17. UNITED STATES 1994 NO_x EMISSIONS BY STATE
 (Million Tonnes)



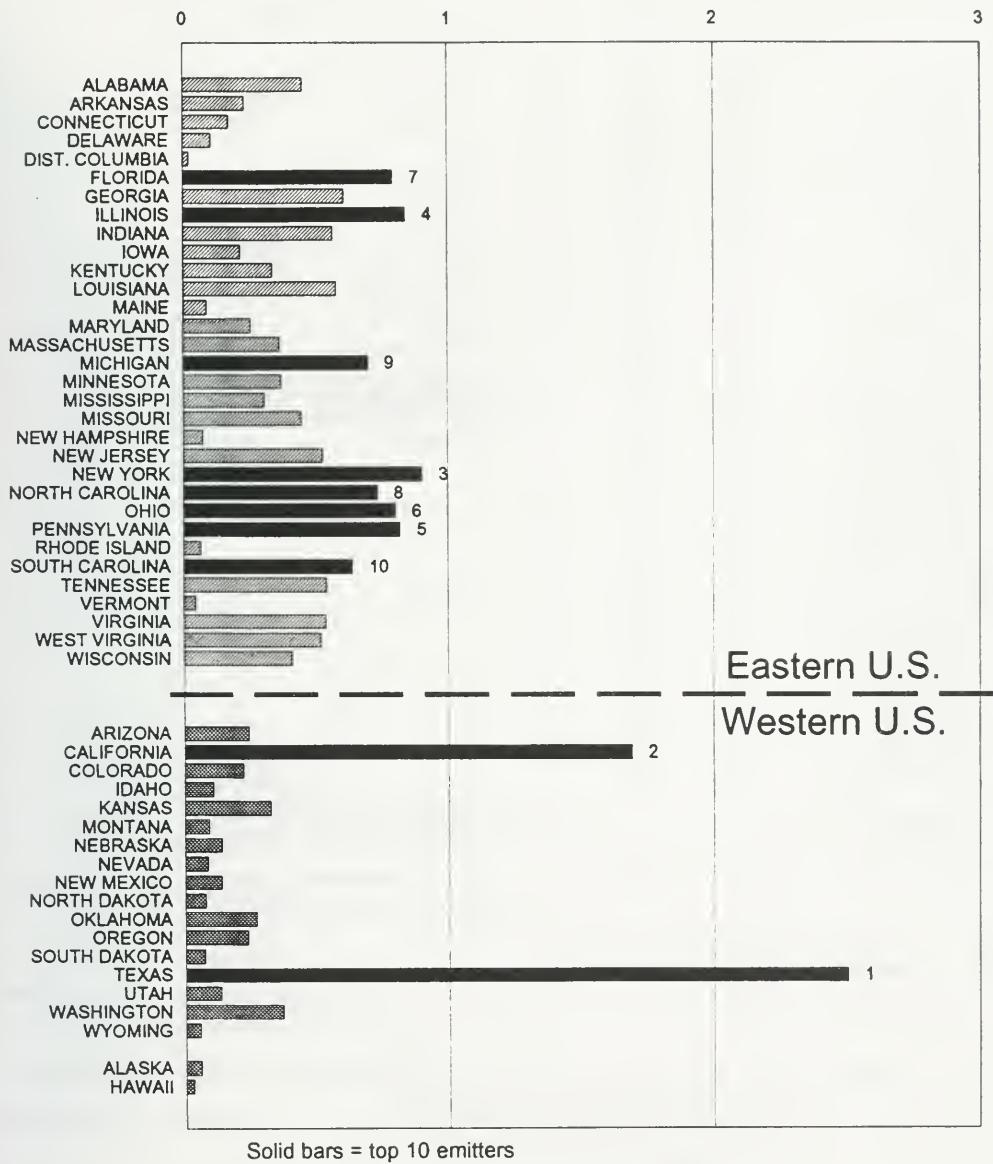
**Table C-18. UNITED STATES 1994 VOC EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	VOC (kt*)	% of U.S.	Rank	WESTERN STATES	VOC (kt*)	% of U.S.	Rank
ALABAMA	456	2.2%	18	ARIZONA	247	1.2%	29
ARKANSAS	237	1.1%	31	CALIFORNIA	1,689	8.0%	2
CONNECTICUT	176	0.8%	34	COLORADO	225	1.1%	32
DELAWARE	105	0.5%	39	IDAHO	109	0.5%	38
DIST. COLUMBIA	23	0.1%	51	KANSAS	327	1.6%	25
FLORIDA	797	3.8%	7	MONTANA	91	0.4%	40
GEORGIA	611	2.9%	11	NEBRASKA	139	0.7%	35
ILLINOIS	845	4.0%	4	NEVADA	86	0.4%	42
INDIANA	570	2.7%	13	NEW MEXICO	136	0.6%	36
IOWA	220	1.0%	33	NORTH DAKOTA	78	0.4%	43
KENTUCKY	339	1.6%	24	OKLAHOMA	273	1.3%	27
LOUISIANA	582	2.8%	12	OREGON	240	1.1%	30
MAINE	88	0.4%	41	SOUTH DAKOTA	73	0.3%	44
MARYLAND	258	1.2%	28	TEXAS	2,508	11.9%	1
MASSACHUSETTS	368	1.8%	23	UTAH	134	0.6%	37
MICHIGAN	703	3.3%	9	WASHINGTON	374	1.8%	22
MINNESOTA	375	1.8%	21	WYOMING	55	0.3%	48
MISSISSIPPI	308	1.5%	26				
MISSOURI	451	2.1%	19				
NEW HAMPSHIRE	73	0.3%	45				
NEW JERSEY	532	2.5%	16	ALASKA	58	0.3%	47
NEW YORK	904	4.3%	3	HAWAII	28	0.1%	50
NORTH CAROLINA	738	3.5%	8				
OHIO	806	3.8%	6				
PENNSYLVANIA	823	3.9%	5				
RHODE ISLAND	64	0.3%	46				
SOUTH CAROLINA	641	3.1%	10				
TENNESSEE	544	2.6%	14				
VERMONT	43	0.2%	49				
VIRGINIA	542	2.6%	15				
WEST VIRGINIA	523	2.5%	17				
WISCONSIN	413	2.0%	20				
EASTERN SUBTOTAL:		14,154	67.3%	WESTERN SUBTOTAL:		6,870	32.7%
UNITED STATES VOC TOTAL: 21,024 kilotonnes							

* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994", EPA-454/R-95-011, October 1995, USEPA.
[2] The emissions are reported in thousand US short tons in the original report. They are converted to thousand tonnes (gigagrams) by multiplying 0.9072.

Figure C-18. UNITED STATES 1994 VOC EMISSIONS BY STATE
 (Million Tonnes)



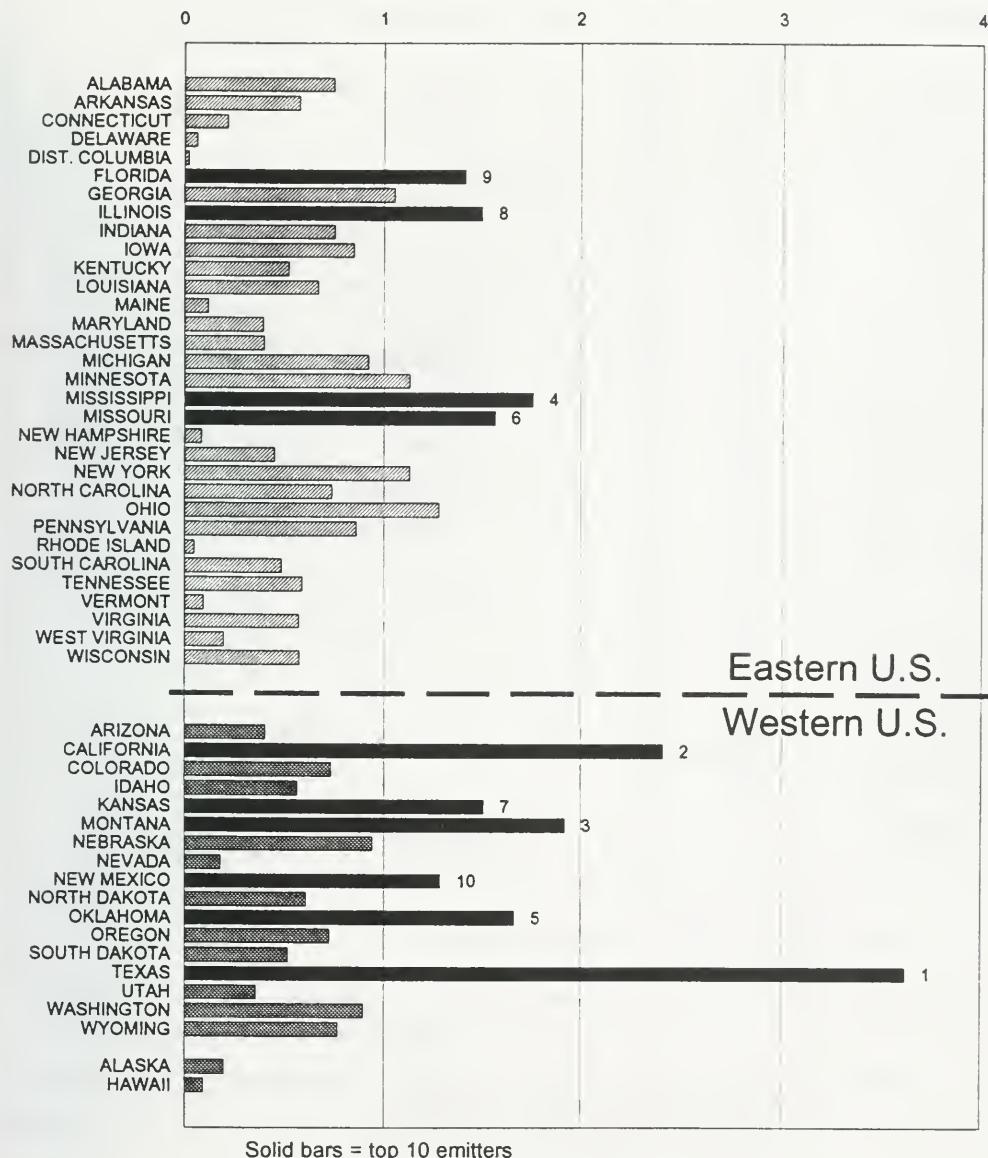
**Table C-19. UNITED STATES 1994 PM10 EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	PM10 (kt*)	% of U.S.	Rank	WESTERN STATES	PM10 (kt*)	% of U.S.	Rank
ALABAMA	748	1.8%	22	ARIZONA	406	1.0%	37
ARKANSAS	579	1.4%	29	CALIFORNIA	2,408	5.8%	2
CONNECTICUT	216	0.5%	41	COLORADO	736	1.8%	24
DELAWARE	62	0.1%	49	IDAHO	567	1.4%	32
DIST. COLUMBIA	23	0.1%	51	KANSAS	1,507	3.7%	7
FLORIDA	1,413	3.4%	9	MONTANA	1,921	4.7%	3
GEORGIA	1,056	2.6%	14	NEBRASKA	943	2.3%	15
ILLINOIS	1,498	3.6%	8	NEVADA	181	0.4%	44
INDIANA	753	1.8%	21	NEW MEXICO	1,283	3.1%	10
IOWA	850	2.1%	19	NORTH DAKOTA	610	1.5%	27
KENTUCKY	525	1.3%	33	OKLAHOMA	1,663	4.0%	5
LOUISIANA	673	1.6%	26	OREGON	727	1.8%	25
MAINE	119	0.3%	45	SOUTH DAKOTA	522	1.3%	34
MARYLAND	398	1.0%	39	TEXAS	3,616	8.8%	1
MASSACHUSETTS	403	1.0%	38	UTAH	360	0.9%	40
MICHIGAN	923	2.2%	16	WASHINGTON	896	2.2%	17
MINNESOTA	1,130	2.7%	13	WYOMING	768	1.9%	20
MISSISSIPPI	1,759	4.3%	4				
MISSOURI	1,565	3.8%	6				
NEW HAMPSHIRE	85	0.2%	48				
NEW JERSEY	455	1.1%	36				
NEW YORK	1,131	2.7%	12				
NORTH CAROLINA	739	1.8%	23	ALASKA	197	0.5%	42
OHIO	1,276	3.1%	11	HAWAII	93	0.2%	47
PENNSYLVANIA	862	2.1%	18				
RHODE ISLAND	50	0.1%	50				
SOUTH CAROLINA	489	1.2%	35				
TENNESSEE	591	1.4%	28				
VERMONT	96	0.2%	46				
VIRGINIA	573	1.4%	31				
WEST VIRGINIA	197	0.5%	43				
WISCONSIN	576	1.4%	30				
EASTERN SUBTOTAL:	21,813	52.9%		WESTERN SUBTOTAL:	19,404	47.1%	
UNITED STATES PM10 TOTAL: 41,217 kilotonnes							

* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994", EPA-454/R-95-011, October 1995, USEPA.
[2] The emissions are reported in thousand US short tons in the original report. They are converted to thousand tonnes (gigagrams) by multiplying 0.9072.
[3] Included natural and open sources.

Figure C-19. UNITED STATES 1994 PM10 EMISSIONS BY STATE
(Million Tonnes)



Solid bars = top 10 emitters

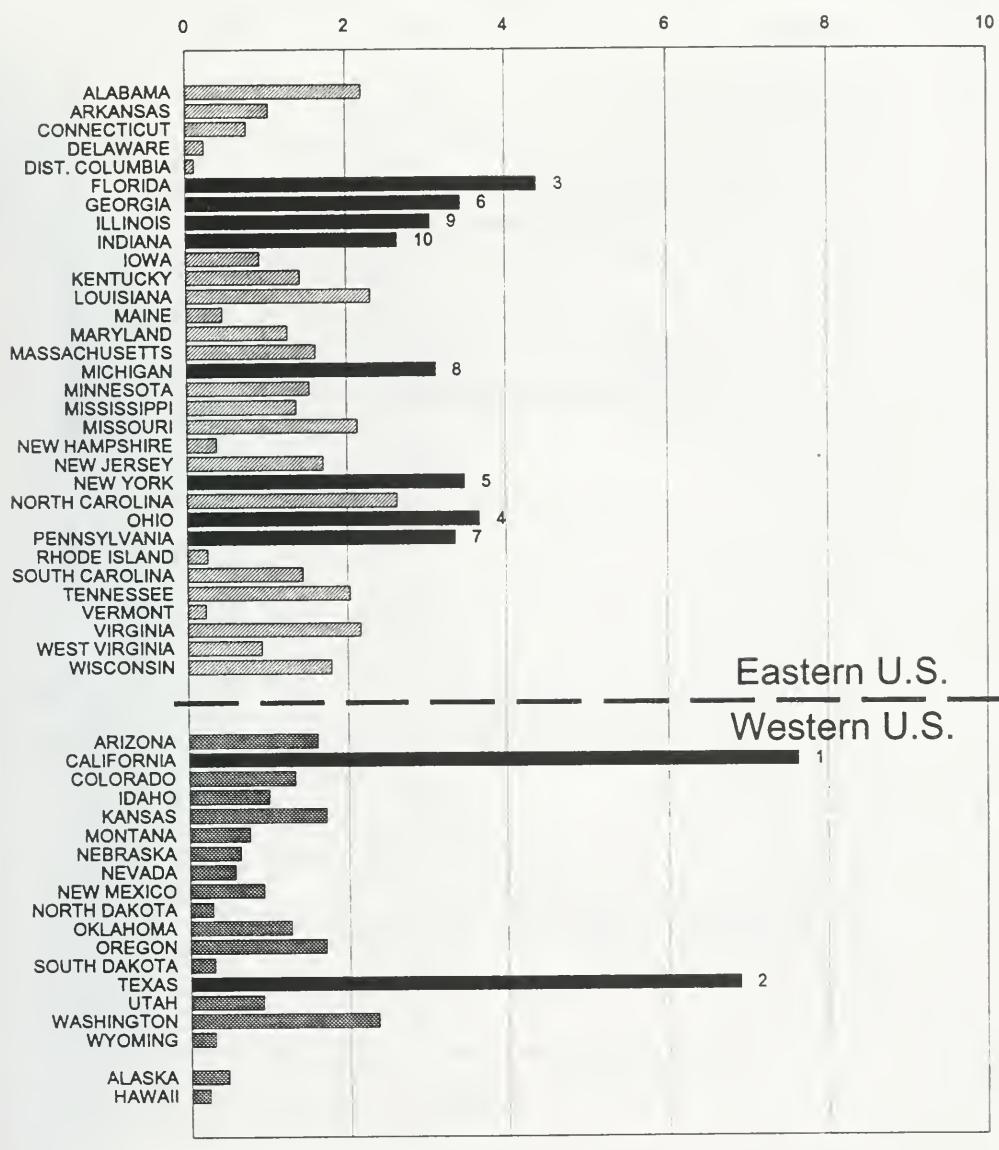
**Table C-20. UNITED STATES 1994 CO EMISSIONS BY STATE
(WITH RANKINGS).**

EASTERN STATES	CO (kt*)	% of U.S.	Rank	WESTERN STATES	CO (kt*)	% of U.S.	Rank
ALABAMA	2,205	2.5%	14	ARIZONA	1,613	1.8%	23
ARKANSAS	1,039	1.2%	31	CALIFORNIA	7,620	8.6%	1
CONNECTICUT	763	0.9%	37	COLORADO	1,315	1.5%	28
DELAWARE	229	0.3%	48	IDAHO	999	1.1%	32
DIST. COLUMBIA	106	0.1%	51	KANSAS	1,713	1.9%	19
FLORIDA	4,393	4.9%	3	MONTANA	752	0.8%	38
GEORGIA	3,448	3.9%	6	NEBRASKA	636	0.7%	39
ILLINOIS	3,072	3.5%	9	NEVADA	566	0.6%	40
INDIANA	2,657	3.0%	10	NEW MEXICO	.924	1.0%	33
IOWA	914	1.0%	35	NORTH DAKOTA	282	0.3%	46
KENTUCKY	1,420	1.6%	26	OKLAHOMA	1,256	1.4%	30
LOUISIANA	2,305	2.6%	13	OREGON	1,702	1.9%	20
MAINE	445	0.5%	42	SOUTH DAKOTA	296	0.3%	45
MARYLAND	1,256	1.4%	29	TEXAS	6,879	7.7%	2
MASSACHUSETTS	1,616	1.8%	22	UTAH	911	1.0%	36
MICHIGAN	3,135	3.5%	8	WASHINGTON	2,367	2.7%	12
MINNESOTA	1,530	1.7%	24	WYOMING	301	0.3%	44
MISSISSIPPI	1,361	1.5%	27				
MISSOURI	2,136	2.4%	16				
NEW HAMPSHIRE	365	0.4%	43				
NEW JERSEY	1,701	1.9%	21	ALASKA	463	0.5%	41
NEW YORK	3,489	3.9%	5	HAWAII	227	0.3%	49
NORTH CAROLINA	2,644	3.0%	11				
OHIO	3,671	4.1%	4				
PENNSYLVANIA	3,370	3.8%	7				
RHODE ISLAND	248	0.3%	47				
SOUTH CAROLINA	1,436	1.6%	25				
TENNESSEE	2,035	2.3%	17				
VERMONT	222	0.2%	50				
VIRGINIA	2,168	2.4%	15				
WEST VIRGINIA	924	1.0%	34				
WISCONSIN	1,798	2.0%	18				
EASTERN SUBTOTAL:	58,098	65.3%		WESTERN SUBTOTAL:	30,822	34.7%	
UNITED STATES CO TOTAL: 88,920 kilotonnes							

* kt = kilotonnes or thousand tonnes (gigagrams)

Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994".
EPA-454/R-95-011, October 1995, USEPA.
[2] The emissions are reported in thousand US short tons in the original report. They are converted to
thousand tonnes (gigagrams) by multiplying 0.9072.

Figure C-20. UNITED STATES 1994 CO EMISSIONS BY STATE
(Million Tonnes)



Solid bars = top 10 emitters

**Table C-21. UNITED STATES TOP 50 AIRS/AFS PLANTS
EMITTING SO₂ - 1994**

RANK	PLANT NAME	STATE	SO ₂ (Tonnes*)	% OF U.S. TOTAL
1	GENERAL JAMES M. GAVIN PLANT	OHIO	338,760	1.8%
2	TVA CUMBERLAND STEAM PLANT	TENNESSEE	314,046	1.8%
3	GEORGIA POWER CO BOWEN STM ELEC GEN STATION	GEORGIA	276,970	1.4%
4	MONONGAHELA POWER - HARRISON	WEST VIRGINIA	264,938	1.4%
5	INDIANA KENTUCKY ELECTRIC CORPORATION	INDIANA	255,307	1.3%
6	PSI - GIBSON	INDIANA	247,699	1.3%
7	KYGER CREEK STATION OHIO VALLEY ELEC CORP	OHIO	226,023	1.2%
8	GEORGIA POWER CO WANSLEY STM ELEC GEN STATION	GEORGIA	225,576	1.2%
9	MUSKINGUM RIVER PLANT	OHIO	222,354	1.2%
10	ILLINOIS POWER CO - BALDWIN POWER PLANT	ILLINOIS	212,074	1.1%
11	WEST PENN POWER CO.	PENNSYLVANIA	176,503	0.9%
12	PENNSYLVANIA ELECTRIC CO.	PENNSYLVANIA	169,062	0.9%
13	JAMES M STUART ELEC GENERATING STATION	OHIO	157,697	0.8%
14	OHIO EDISON COMPANY W H SAMMIS PLANT	OHIO	153,436	0.8%
15	CENTRAL ILLINOIS PUBLIC SERVICE	ILLINOIS	150,696	0.8%
16	ALABAMA POWER CO E.C. GASTON	ALABAMA	141,959	0.7%
17	OHIO POWER-KAMMER PLANT	WEST VIRGINIA	140,770	0.7%
18	CARDINAL OPERATING COMPANY	OHIO	134,947	0.7%
19	VIRGINIA POWER - MOUNT STORM	WEST VIRGINIA	128,360	0.7%
20	ALCOA GENERATING CORP.	INDIANA	122,727	0.6%
21	PEN ELEC - KEYSTONE	PENNSYLVANIA	122,363	0.6%
22	PP&L - MONTOUR SES	PENNSYLVANIA	120,159	0.6%
23	GEORGIA POWER CO YATES STM ELEC GEN STATION	GEORGIA	117,794	0.6%
24	TVA-GALLATIN	TENNESSEE	116,778	0.6%
25	CEI - EASTLAKE	OHIO	116,618	0.6%
26	DETROIT EDISON MONROE	MICHIGAN	116,611	0.6%
27	COLUMBUS SOUTHERN POWER - CONESVILLE	OHIO	116,328	0.6%
28	UNION ELECTRIC COMPANY	MISSOURI	108,083	0.6%
29	TVA KINGSTON STEAM PLANT KINGSTON	TENNESSEE	106,493	0.6%
30	PP&L - BRUNNER ISLAND	PENNSYLVANIA	106,237	0.6%
31	TEXAS UTILITIES ELECTRIC COMPANY	TEXAS	102,407	0.5%
32	ASSOCIATED ELECTRIC COOP	MISSOURI	101,006	0.5%
33	PSI - CAYUGA	INDIANA	99,768	0.5%
34	TVA JOHNSONVILLE STEAM PLANT	TENNESSEE	98,561	0.5%
35	COM ED - KINCAID GENERATING STATION	ILLINOIS	97,367	0.5%
36	KENTUCKY UTILITIES	KENTUCKY	97,264	0.5%
37	PENNSYLVANIA ELECTRIC CO.	PENNSYLVANIA	95,535	0.5%
38	CC&E W.C. BECKJORD STATION	OHIO	94,932	0.5%
39	CINCINNATI GAS & ELECTRIC CO.	OHIO	93,455	0.5%
40	ALABAMA POWER GORGAS	ALABAMA	92,769	0.5%
41	GEORGIA POWER CO BRANCH STM ELEC GEN STATION	GEORGIA	91,829	0.5%
42	CP&L ROXBORO	NORTH CAROLINA	88,037	0.5%
43	TEXAS UTILITIES MINING COMPANY	TEXAS	85,484	0.4%
44	INDIANA MICHIGAN POWER COMPANY	INDIANA	82,225	0.4%
45	DUKE POWER CO BELEWS CREEK STEAM STATION	NORTH CAROLINA	81,779	0.4%
46	ELECTRIC ENERGY, INC. - JOPPA STEAM ELEC. STATION	ILLINOIS	79,734	0.4%
47	MONONGAHELA POWER - FORT MARTIN	WEST VIRGINIA	77,027	0.4%
48	LICO - NORTHPORT	NEW YORK	76,785	0.4%
49	APPALACHIAN POWER CO. JOHN E. AMOS PLANT	WEST VIRGINIA	76,674	0.4%
50	ATLANTIC CITY ELEC	NEW JERSEY	76,193	0.4%
TOTAL OF TOP 50 SOURCES:			6,996,199	36.5%

* tonne = 1,000 kg (or 1 Mg. megagrams)

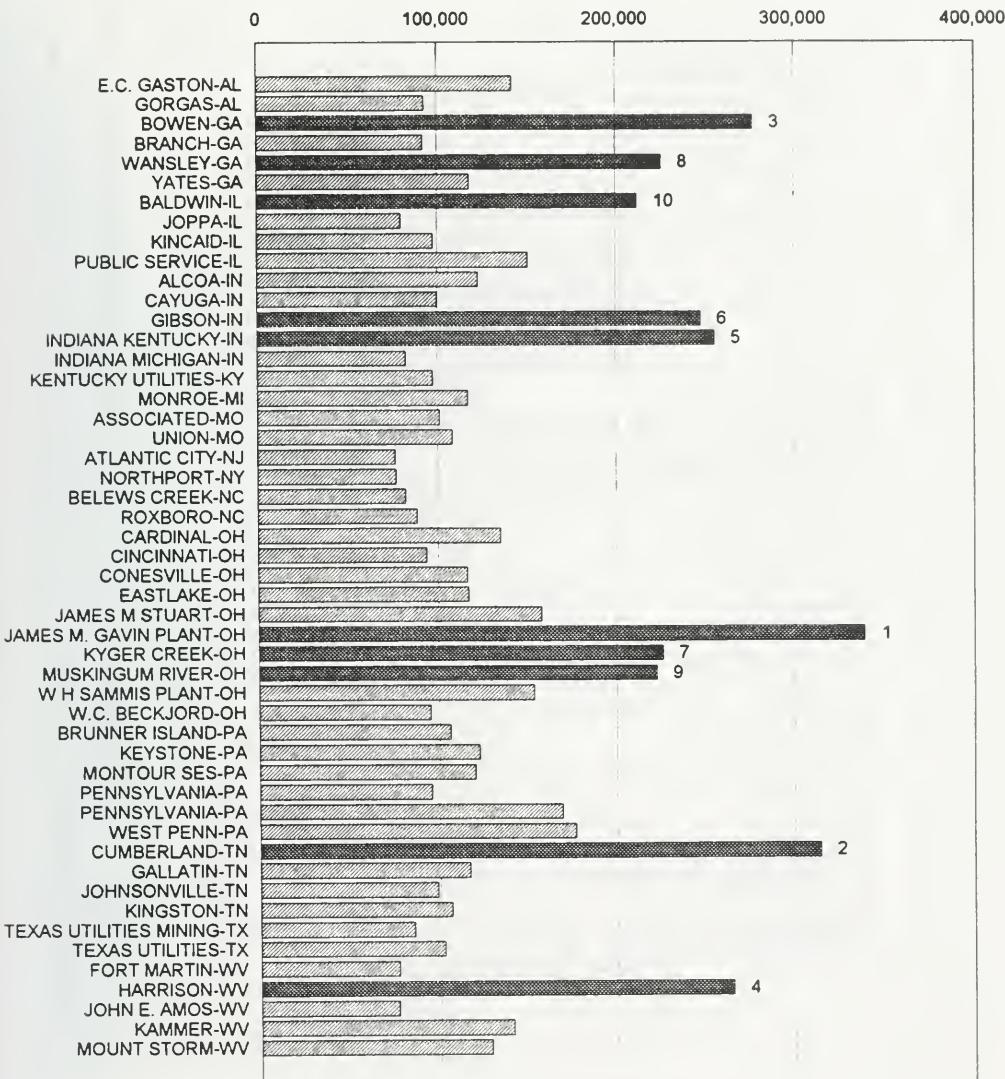
Notes: [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994*, EPA-454/R-95-011, October 1995, USEPA.

[2] The emissions are reported in US short tons/year in the original report. They are converted to tonnes (Mg. megagrams) by multiplying 0.9072.

[3] AIRS/AFS" - Aerometric Information Retrieval System Facility Subsystem.

Figure C-21. UNITED STATES TOP 50 AIR/AFS PLANTS EMITTING SO₂ - 1994

(Tonnes)



**Table C-22. UNITED STATES TOP 50 AIRS/AFS PLANTS
EMITTING NO_x - 1994**

RANK	PLANT NAME	STATE	NO _x (Tonnes*)	% OF U.S. TOTAL
1	TVA	KENTUCKY	100,487	0.5%
2	TEXAS UTILITIES ELECTRIC COMPANY	TEXAS	97,743	0.5%
3	TVA CUMBERLAND STEAM PLANT	TENNESSEE	97,005	0.5%
4	DETROIT EDISON MONROE	MICHIGAN	95,516	0.4%
5	GENERAL JAMES M. GAVIN PLANT	OHIO	78,698	0.4%
6	JAMES M STUART ELEC GENERATING STATION	OHIO	69,768	0.3%
7	COM ED - POWERTON STATION	ILLINOIS	65,888	0.3%
8	INDIANA KENTUCKY ELECTRIC CORPORATION	INDIANA	64,144	0.3%
9	APPALACHIAN POWER CO. JOHN E. AMOS PLANT	WEST VIRGINIA	59,385	0.3%
10	ILLINOIS POWER CO - BALDWIN POWER PLANT	ILLINOIS	57,346	0.3%
11	GEORGIA POWER CO BOWEN STM ELEC GEN STATION	GEORGIA	57,272	0.3%
12	ALABAMA POWER CO E.C. GASTON	ALABAMA	56,572	0.3%
13	COM ED - KINCAID GENERATING STATION	ILLINOIS	55,632	0.3%
14	CP&L ROXBORO	NORTH CAROLINA	52,925	0.2%
15	PENN POWER-MANSFIELD	PENNSYLVANIA	52,583	0.2%
16	CENTRAL ILLINOIS PUBLIC SERVICE	ILLINOIS	52,334	0.2%
17	KYGER CREEK STATION OHIO VALLEY ELEC CORP	OHIO	52,130	0.2%
18	PSI - GIBSON	INDIANA	51,768	0.2%
19	OHIO EDISON COMPANY W H SAMMIS PLANT	OHIO	49,128	0.2%
20	ASSOCIATED ELECTRIC COOP	MISSOURI	48,353	0.2%
21	ALABAMA POWER CO BARRY	ALABAMA	47,545	0.2%
22	MONONGAHELA POWER - HARRISON	WEST VIRGINIA	46,019	0.2%
23	DUKE POWER CO BELEWS CREEK STEAM STATION	NORTH CAROLINA	45,868	0.2%
24	TEXAS UTILITIES MINING COMPANY	TEXAS	44,808	0.2%
25	PENNSYLVANIA ELECTRIC CO.-CONERNAUGH	PENNSYLVANIA	43,226	0.2%
26	PENNSYLVANIA ELECTRIC CO.-HOMER CITY	PENNSYLVANIA	42,844	0.2%
27	PEN ELEC - KEYSTONE	PENNSYLVANIA	41,794	0.2%
28	MUSKINGUM RIVER PLANT	OHIO	41,195	0.2%
29	GEORGIA POWER CO BRANCH STM ELEC GEN STATION	GEORGIA	39,244	0.2%
30	WEST PENN POWER CO.	PENNSYLVANIA	38,142	0.2%
31	PP&L - MONTOUR	PENNSYLVANIA	35,960	0.2%
32	TVA WIDOWS CREEK	ALABAMA	35,565	0.2%
33	DETROIT EDISON ST. CLAIR	MICHIGAN	35,264	0.2%
34	TVA COLBERT	ALABAMA	34,697	0.2%
35	PP&L - BRUNNER ISLAND	PENNSYLVANIA	34,451	0.2%
36	ARIZONA PUBLIC SERVICES, 4 CORNERS	NEW MEXICO	34,398	0.2%
37	GEORGIA POWER CO WANSLY STM ELEC GEN STATION	GEORGIA	33,498	0.2%
38	UNION ELECTRIC COMPANY	MISSOURI	33,382	0.2%
39	NEW ENGLAND POWER CO	MASSACHUSETTS	32,686	0.2%
40	BADGER PAPER MILLS INC., DAYTON DIV	OHIO	32,209	0.2%
41	OHIO POWER-KAMMER PLANT	WEST VIRGINIA	31,353	0.1%
42	INDIANA MICHIGAN POWER COMPANY	INDIANA	31,196	0.1%
43	PSE & G CO.	NEW JERSEY	30,965	0.1%
44	SALT RIVER PROJECT-NAVAGOJ STATION	ARIZONA	29,730	0.1%
45	ALABAMA POWER GORGAS	ALABAMA	29,632	0.1%
46	IPAICO - PETERSBURG	INDIANA	28,623	0.1%
47	MONONGAHELA POWER - PLEASANTS	WEST VIRGINIA	28,356	0.1%
48	PACIFICORP - JIM BRIDGER	WYOMING	28,101	0.1%
49	VIRGINIA POWER - MOUNT STORM	WEST VIRGINIA	27,842	0.1%
50	HOUSTON LIGHTING & POWER COMPANY	TEXAS	27,666	0.1%
TOTAL OF TOP 50 SOURCES:			2,380,936	11.1%

* tonne = 1,000 kg (or 1 Mg, megagrams)

Notes. [1] Emissions estimates are extracted from National Air Pollutant Emissions Trends, 1900-1994", EPA-454/R-95-011, October 1995, USEPA.

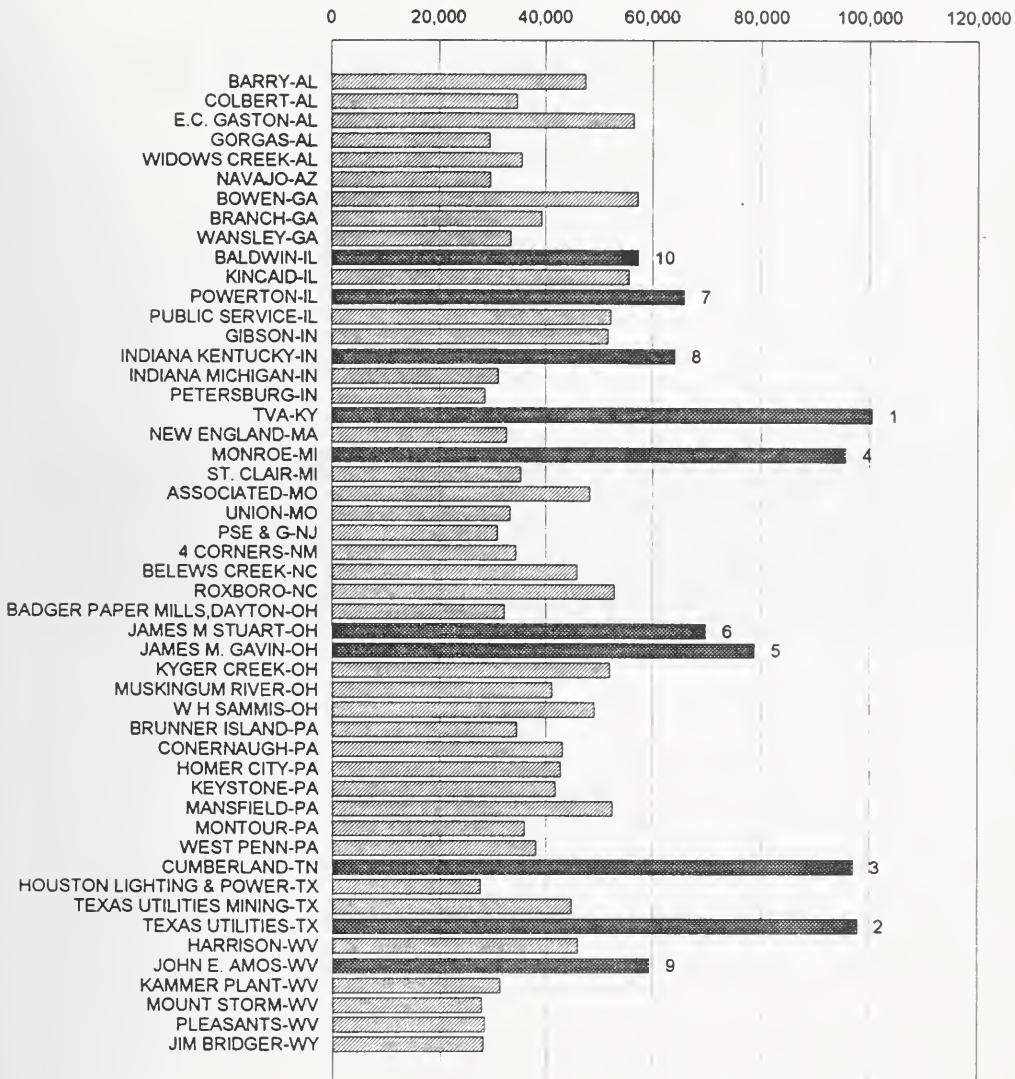
[2] The emissions are reported in US short tons/year in the original report. They are converted to tonnes (Mg, megagrams) by multiplying 0.9072.

[3] 1994 Rank numbers 25 and 26 are the same plant but have different NEDS ID.

[4] AIRS/AFS" - Aerometric Information Retrieval System Facility Subsystem.

Figure C-22. UNITED STATES TOP 50 AIR/AFS PLANTS EMITTING NO_x - 1994

(Tonnes)





FAST REFERENCE EMISSION DOCUMENT

VERSION 3

SECTION D:

CANADA AND UNITED STATES EMISSIONS



TABLE D-1. CANADA AND UNITED STATES SO₂ EMISSION TRENDS, 1980 - 1994.

	(million metric tonnes)														
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CANADA	4.63	4.29	3.61	3.63	3.95	3.71	3.60 *	3.80 *	3.80 *	3.80 *	3.26	3.24	3.12	3.02	2.67
UNITED STATES	23.50	---	---	---	21.29	21.07	20.36	20.14	20.55	20.67	20.35	20.02	19.81	19.52	19.16
TOTAL	28.14	---	---	---	25.24	24.78	23.96	23.94	24.35	24.47	23.61	23.26	22.93	22.54	21.83

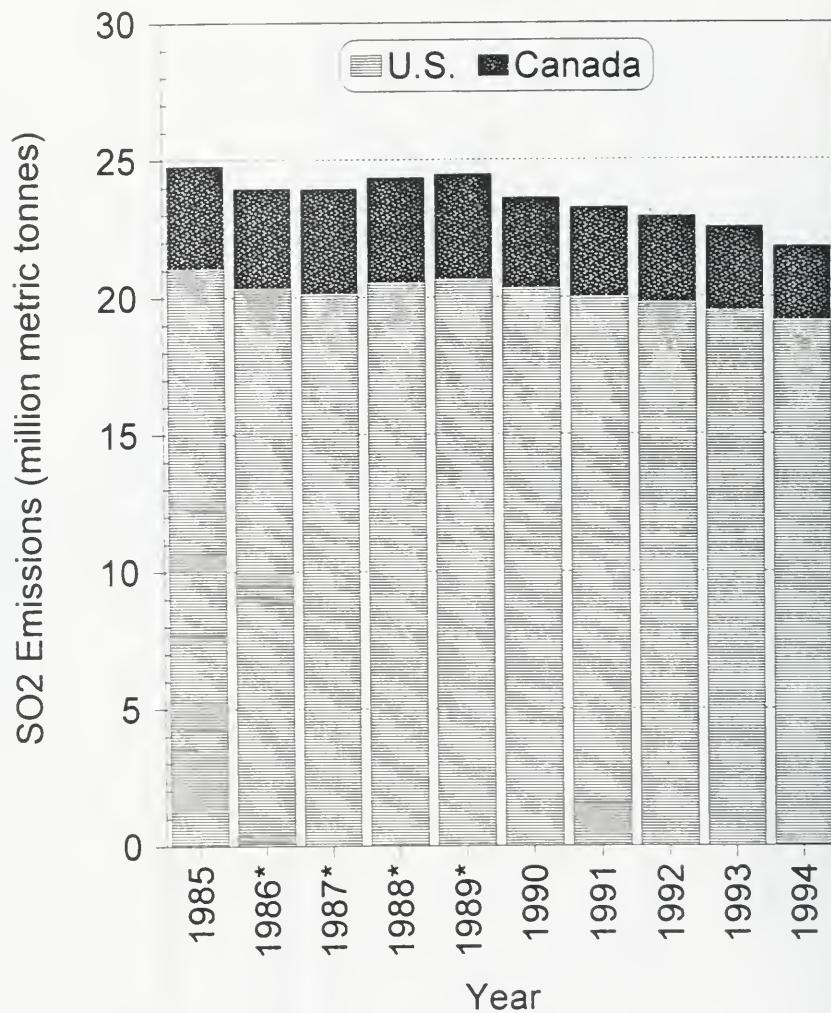
--- = not available.

* Canada totals for 1986-1989 are rounded to the nearest hundred thousand metric tonnes.

SOURCES:

US: U.S. EPA report, "National Air Pollutant Emission Trends, 1900-1994", EPA-454/R-95-011, October 1995.
 CANADA : FRED V3, Table B-1.

**FIGURE D-1. CANADA AND UNITED STATES
SO₂ EMISSION TRENDS, 1985-1994.**



* Canada totals for 1986 -1989 are rounded to the nearest hundred thousand metric tonnes.

TABLE D-2. CANADA AND UNITED STATES NO_x EMISSION TRENDS, 1985-1994.
 (million metric tonnes)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CANADA	2.04	2.04	2.13	2.20	2.19	2.11	2.00	1.97	1.98	1.98
UNITED STATES	20.74	20.27	20.32	21.43	21.07	20.90	20.57	20.73	21.12	21.42
TOTAL	22.78	22.32	22.45	23.63	23.26	23.01	22.57	22.70	23.10	23.41

SOURCES:

U.S.: EPA Report, "National Air Pollutant Emission Trends, 1900-1994", EPA-454/R-95-011, October 1995.
 CANADA: FRED V3, Table B-2.

FIGURE D-2. CANADA AND UNITED STATES NO_x EMISSION TRENDS, 1985 - 1994.

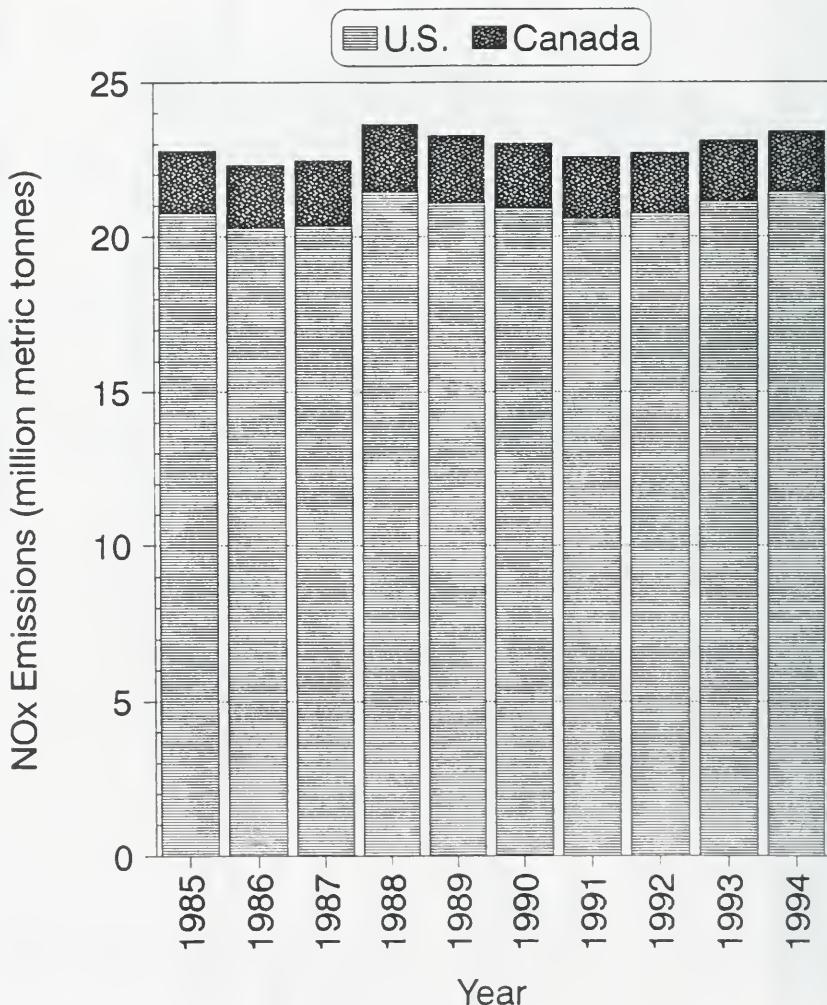


TABLE D-3. CANADA AND UNITED STATES VOC EMISSION TRENDS, 1985 - 1994.
 (million metric tonnes)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
CANADA	2.79	2.82	2.87	2.91	2.86	2.84	2.81	2.74	2.79	2.78
UNITED STATES	23.40	22.67	22.48	23.33	21.71	21.41	20.75	20.34	20.48	21.02
TOTAL	26.19	25.50	25.35	26.24	24.57	24.25	23.56	23.08	23.27	23.80

SOURCES:

U.S.: EPA Report, "National Air Pollutant Emission Trends, 1900-1994", EPA-454/R-95-011, October 1995.
 CANADA: FRED V3, Table B-3.

FIGURE D-3. CANADA AND UNITED STATES VOC EMISSION TRENDS, 1985 - 1994.

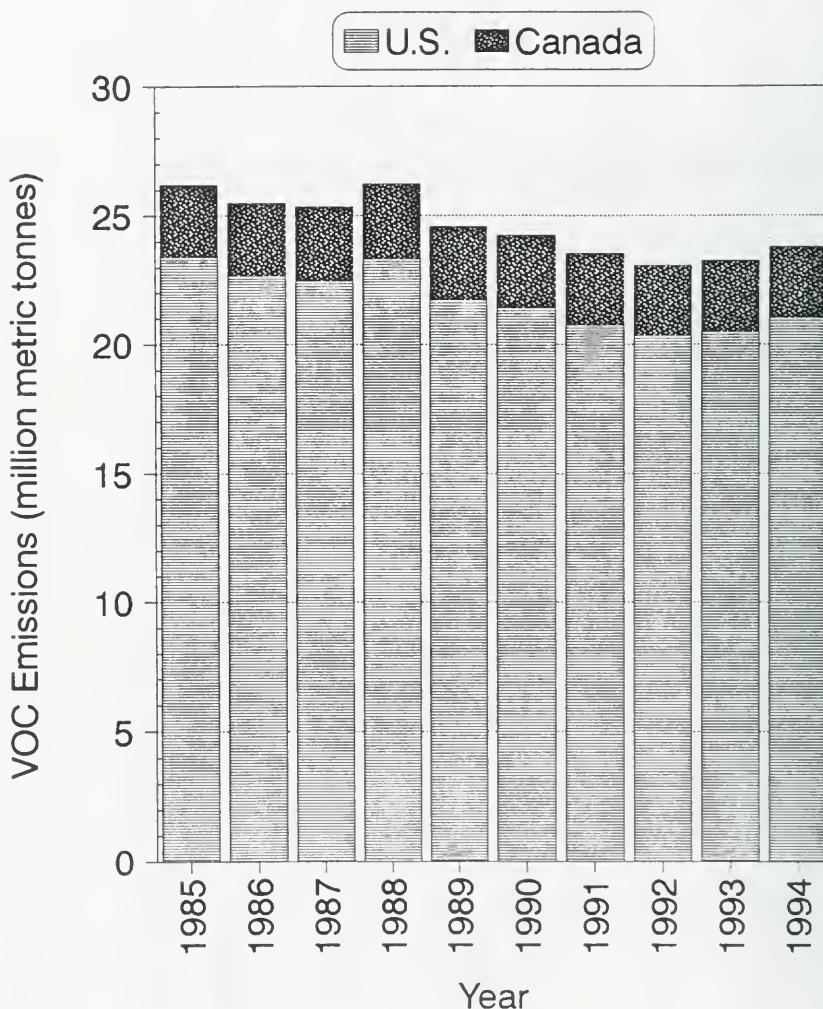


TABLE D-4. CANADA AND UNITED STATES 1985 SO₂ EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.
 (Thousand metric tonnes)

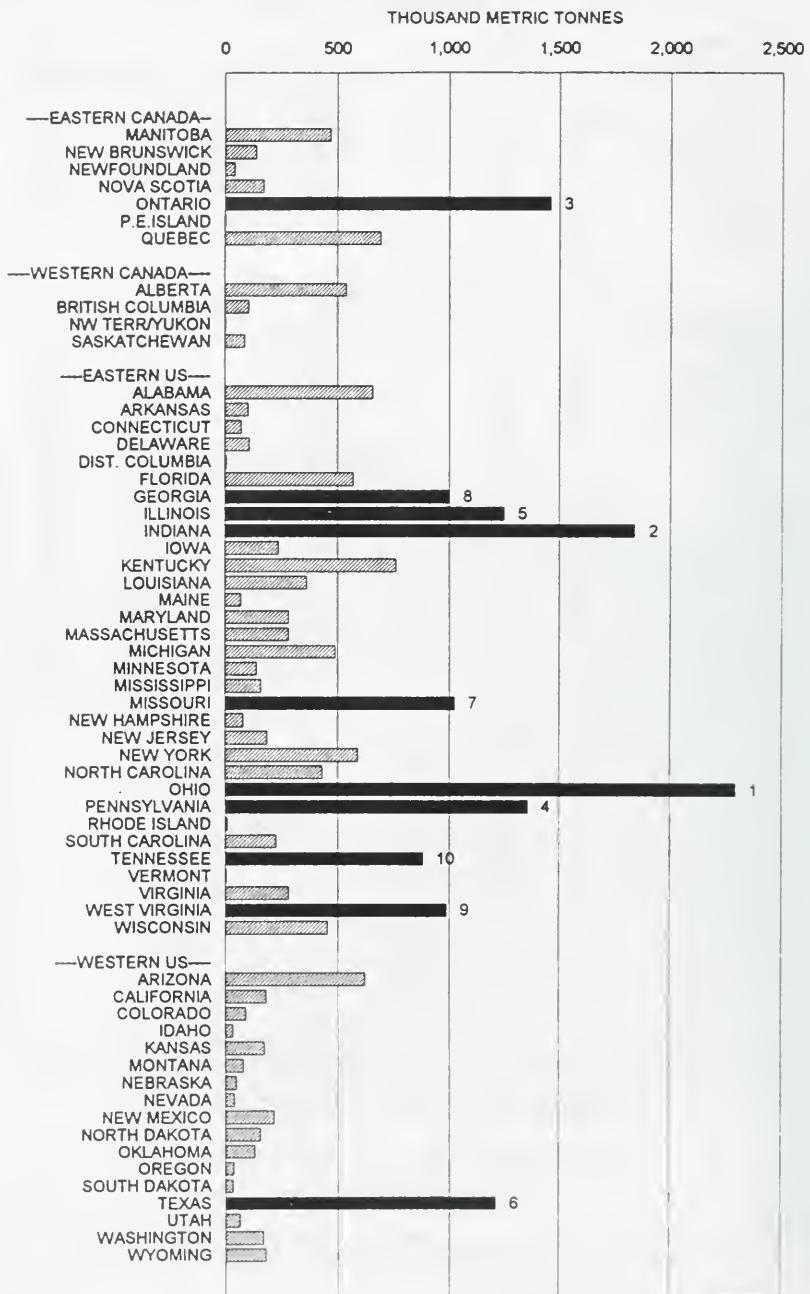
EASTERN STATES/PROV.	SO ₂	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	SO ₂	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	469	1.9%	19	ALBERTA	539	2.2%	17
NEW BRUNSWICK	138	0.6%	38	BRITISH COLUMBIA	105	0.4%	41
NEWFOUNDLAND	43	0.2%	51	NW TERR/YUKON	2	0.0%	59
NOVA SCOTIA	170	0.7%	33	SASKATCHEWAN	86	0.4%	44
ONTARIO	1,461	6.0%	3	total:	732	3.0%	
P.E.ISLAND	2	0.0%	60				
QUEBEC	693	2.8%	12				
total:	2,976	12.2%					
UNITED STATES				UNITED STATES			
ALABAMA	657	2.7%	13	ARIZONA	621	2.6%	14
ARKANSAS	104	0.4%	42	CALIFORNIA	180	0.7%	30
CONNECTICUT	73	0.3%	47	COLORADO	90	0.4%	43
DELAWARE	107	0.4%	40	IDAHO	32	0.1%	55
DIST. COLUMBIA	6	0.0%	57	KANSAS	171	0.7%	32
FLORIDA	569	2.3%	16	MONTANA	78	0.3%	45
GEORGIA	1,002	4.1%	8	NEBRASKA	49	0.2%	50
ILLINOIS	1,248	5.1%	5	NEVADA	39	0.2%	52
INDIANA	1,842	7.6%	2	NEW MEXICO	213	0.9%	28
IOWA	235	1.0%	26	NORTH DAKOTA	151	0.6%	36
KENTUCKY	757	3.1%	11	OKLAHOMA	129	0.5%	39
LOUISIANA	362	1.5%	22	OREGON	37	0.2%	53
MAINE	70	0.3%	48	SOUTH DAKOTA	33	0.1%	54
MARYLAND	281	1.2%	23	TEXAS	1,212	5.0%	6
MASSACHUSETTS	281	1.2%	24	UTAH	63	0.3%	49
MICHIGAN	490	2.0%	18	WASHINGTON	165	0.7%	34
MINNESOTA	138	0.6%	37	WYOMING	176	0.7%	31
MISSISSIPPI	158	0.6%	35	total:	3,439	14.1%	
MISSOURI	1,025	4.2%	7				
NEW HAMPSHIRE	78	0.3%	46				
NEW JERSEY	183	0.8%	29				
NEW YORK	589	2.4%	15				
NORTH CAROLINA	430	1.8%	21				
OHIO	2,294	9.4%	1				
PENNSYLVANIA	1,356	5.6%	4				
RHODE ISLAND	8	0.0%	56				
SOUTH CAROLINA	223	0.9%	27				
TENNESSEE	879	3.6%	10				
VERMONT	5	0.0%	58				
VIRGINIA	280	1.1%	25				
WEST VIRGINIA	987	4.1%	9				
WISCONSIN	454	1.9%	20				
total:	17,172	70.6%					
Eastern Canada + Eastern U.S.:	20,148	82.9%		Western Canada + Western U.S.:	4,170	17.1%	
Canada SO ₂ total:				3,707 kilotonnes	15.2%		
United States SO ₂ total:				20,611 kilotonnes	84.8%		
CANADA + U.S. SO₂ TOTAL:	24,318	kilotonnes	100.0%				

Sources:

- U.S.: National Inventory 2-Tier Report Generator Database, CHIEF BBS, U.S.EPA, May 1995.
- CANADA (except Ontario): Environment Canada report, "Canadian Emissions Inventory of Common Air Contaminants (1985)", EPS 5/AP/3, March 1990.
- ONTARIO: Ontario MOEE, December 1995.

Note: The U.S.EPA has published an updated value of 21.07 million metric tonnes for the U.S. 1985 SO₂ total in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995; however, the U.S. data presented in this table is the latest available state breakdown for 1985.

**FIGURE D-4. CANADA AND UNITED STATES 1985 SO₂ EMISSIONS
BY PROVINCE/TERRITORY AND STATE.**



Solid bars = top 10 provinces/states.

TABLE D-5. CANADA AND UNITED STATES 1990 SO₂ EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.
 (Thousand metric tonnes)

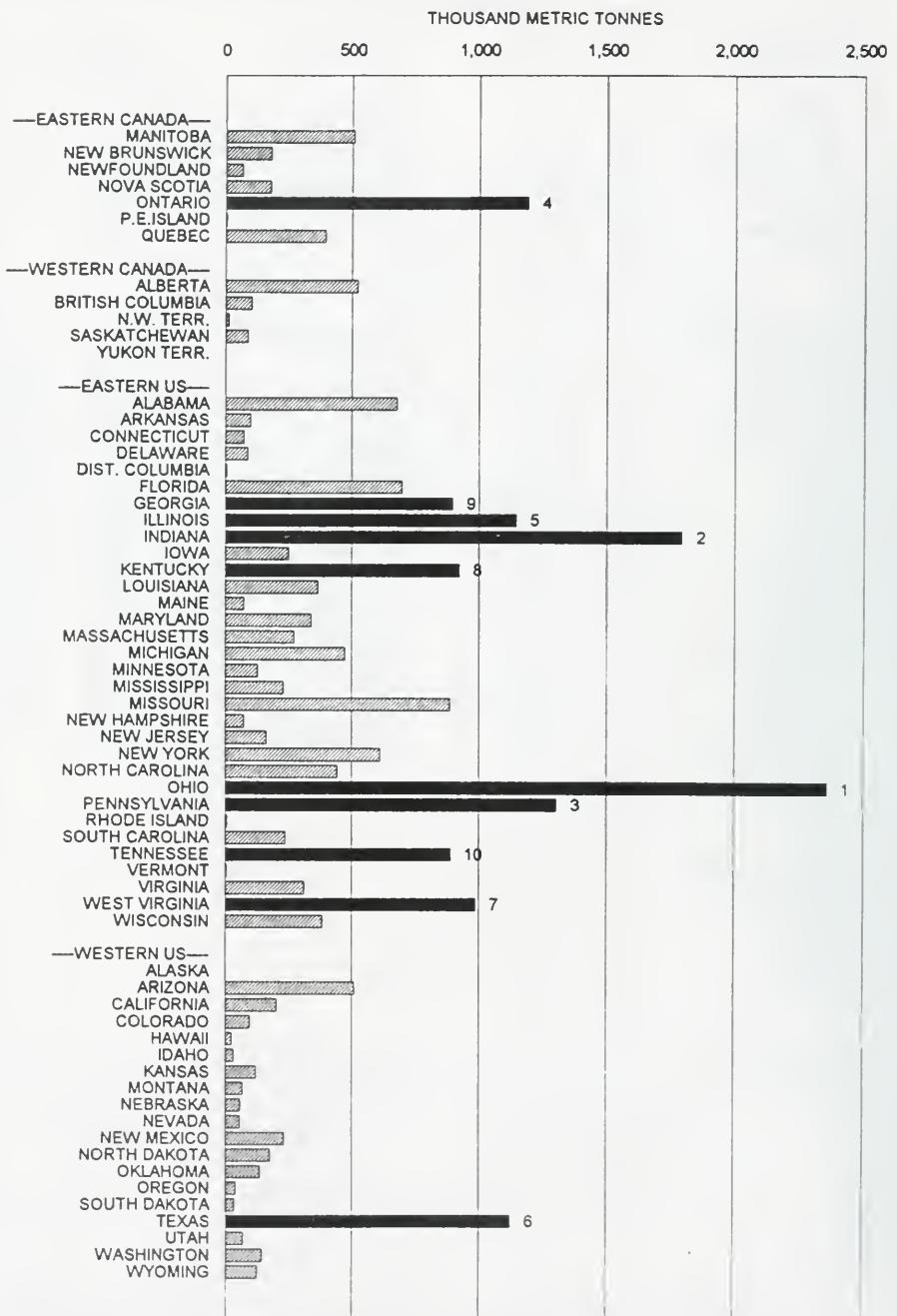
EASTERN STATES/PROV.	SO ₂	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	SO ₂	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	508	2.1%	17	ALBERTA	522	2.2%	15
NEW BRUNSWICK	182	0.8%	31	BRITISH COLUMBIA	105	0.4%	40
NEWFOUNDLAND	66	0.3%	50	NW TERR.	15	0.1%	57
NOVA SCOTIA	179	0.8%	32	SASKATCHEWAN	90	0.4%	44
ONTARIO	1,192	5.0%	4	YUKON	1.5	0.0%	63
P.E.ISLAND	4	0.0%	61		total:	732	3.1%
QUEBEC	396	1.7%	20				
	total:	2,528	10.6%				
UNITED STATES				UNITED STATES			
ALABAMA	678	2.9%	13	ALASKA	2	0.0%	62
ARKANSAS	101	0.4%	41	ARIZONA	510	2.1%	16
CONNECTICUT	75	0.3%	46	CALIFORNIA	203	0.9%	30
DELAWARE	91	0.4%	43	COLORADO	97	0.4%	42
DIST. COLUMBIA	7	0.0%	59	HAWAII	26	0.1%	56
FLORIDA	697	2.9%	12	IDAHO	33	0.1%	55
GEORGIA	897	3.8%	9	KANSAS	122	0.5%	39
ILLINOIS	1,147	4.8%	5	MONTANA	70	0.3%	48
INDIANA	1,797	7.6%	2	NEBRASKA	60	0.3%	51
IOWA	252	1.1%	26	NEVADA	58	0.2%	52
KENTUCKY	922	3.9%	8	NEW MEXICO	232	1.0%	28
LOUISIANA	366	1.5%	22	NORTH DAKOTA	178	0.7%	33
MAINE	75	0.3%	45	OKLAHOMA	138	0.6%	36
MARYLAND	340	1.4%	23	OREGON	42	0.2%	53
MASSACHUSETTS	273	1.1%	25	SOUTH DAKOTA	35	0.1%	54
MICHIGAN	474	2.0%	18	TEXAS	1,124	4.7%	6
MINNESOTA	130	0.5%	37	UTAH	68	0.3%	49
MISSISSIPPI	230	1.0%	29	WASHINGTON	145	0.6%	35
MISSOURI	885	3.7%	11	WYOMING	127	0.5%	38
NEW HAMPSHIRE	75	0.3%	47		total:	3,271	13.8%
NEW JERSEY	165	0.7%	34				
NEW YORK	611	2.6%	14				
NORTH CAROLINA	444	1.9%	19				
OHIO	2,358	9.9%	1				
PENNSYLVANIA	1,306	5.5%	3				
RHODE ISLAND	7	0.0%	58				
SOUTH CAROLINA	238	1.0%	27				
TENNESSEE	888	3.7%	10				
VERMONT	5	0.0%	60				
VIRGINIA	312	1.3%	24				
WEST VIRGINIA	988	4.2%	7				
WISCONSIN	385	1.6%	21				
	total:	17,217	72.5%				
Eastern Canada + Eastern U.S.:	19,745	83.1%		Western Canada + Western U.S.:	4,004	16.9%	
Canada SO ₂ total:				3,260 kilotonnes		13.7%	
United States SO ₂ total:				20,488 kilotonnes		86.3%	
CANADA + U.S. SO₂ TOTAL:				23,748 kilotonnes		100.0%	

Sources:

- U.S. National Inventory 2-Tier Report Generator Database, CHIEF BBS, U.S. EPA, May 1995.
- Canadian provinces and territories except Ontario: Environment Canada, Pollution Data Branch, October 1995.
- Ontario: Ontario MOEE, December 1995.

Note: The U.S. EPA has published an updated value of 20.35 million metric tonnes for the U.S. 1990 SO₂ emission total in the report "National Air Pollutant Emission Trends, 1990 - 1994", EPA-454/R-95-011, October 1995.

**FIGURE D-5. CANADA & UNITED STATES 1990 SO₂ EMISSIONS
BY PROVINCE/TERRITORY AND STATE.**



Solid bars = top 10 provinces/states.

TABLE D-6. CANADA AND UNITED STATES 1994 SO₂ EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.

(1000 metric tonnes)

EASTERN STATES/PROV.	SO ₂	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	SO ₂	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	398	1.8%	19	ALBERTA	640	2.9%	13
NEW BRUNSWICK	135	0.6%	35	BRITISH COLUMBIA	101	0.5%	41
NEWFOUNDLAND	55	0.3%	51	NW TERR.	15	0.1%	57
NOVA SCOTIA	159	0.7%	32	SASKATCHEWAN	102	0.5%	40
ONTARIO	818	2.8%	14	YUKON	2	0.0%	83
P.E.ISLAND	6	0.0%	59				
QUEBEC	438	2.0%	18				
total:	1,809	8.3%					
UNITED STATES				UNITED STATES			
ALABAMA	671	3.1%	11	ALASKA	2	0.0%	82
ARKANSAS	98	0.4%	42	ARIZONA	305	1.4%	23
CONNECTICUT	50	0.2%	53	CALIFORNIA	185	0.8%	31
DELAWARE	88	0.4%	44	COLORADO	98	0.4%	43
DIST. COLUMBIA	8	0.0%	58	HAWAII	18	0.1%	58
FLORIDA	754	3.5%	9	IDAHO	34	0.2%	55
GEORGIA	719	3.3%	10	KANSAS	108	0.5%	39
ILLINOIS	1078	4.9%	8	MONTANA	74	0.3%	45
INDIANA	1591	7.3%	2	NEBRASKA	84	0.3%	48
IOWA	231	1.1%	27	NEVADA	57	0.3%	50
KENTUCKY	984	4.4%	7	NEW MEXICO	240	1.1%	28
LOUISIANA	394	1.8%	20	NORTH DAKOTA	194	0.9%	29
MAINE	73	0.3%	48	OKLAHOMA	132	0.6%	36
MARYLAND	329	1.5%	21	OREGON	50	0.2%	52
MASSACHUSETTS	186	0.9%	30	SOUTH DAKOTA	37	0.2%	54
MICHIGAN	474	2.2%	18	TEXAS	1179	5.4%	4
MINNESOTA	130	0.6%	37	UTAH	71	0.3%	47
MISSISSIPPI	212	1.0%	28	WASHINGTON	156	0.7%	33
MISSOURI	850	3.0%	12	WYOMING	120	0.5%	38
NEW HAMPSHIRE	58	0.3%	49	total:	3,120	14.3%	
NEW JERSEY	148	0.7%	34				
NEW YORK	454	2.1%	17				
NORTH CAROLINA	488	2.2%	15				
OHIO	2185	10.0%	1				
PENNSYLVANIA	1205	5.5%	3				
RHODE ISLAND	5	0.0%	60				
SOUTH CAROLINA	251	1.2%	25				
TENNESSEE	839	3.8%	8				
VERMONT	5	0.0%	61				
VIRGINIA	322	1.5%	22				
WEST VIRGINIA	1092	5.0%	5				
WISCONSIN	291	1.3%	24				
total:	18,040	73.5%					
Eastern Canada + Eastern U.S.:	17,849	81.8%		Western Canada + Western U.S.:	3,980	18.2%	
Canada SO ₂ total:				2,669 kilotonnes		12.2%	
United States SO ₂ total:				19,158 kilotonnes		87.8%	
CANADA + U.S. SO ₂ TOTAL:				21,827 kilotonnes		100.0%	

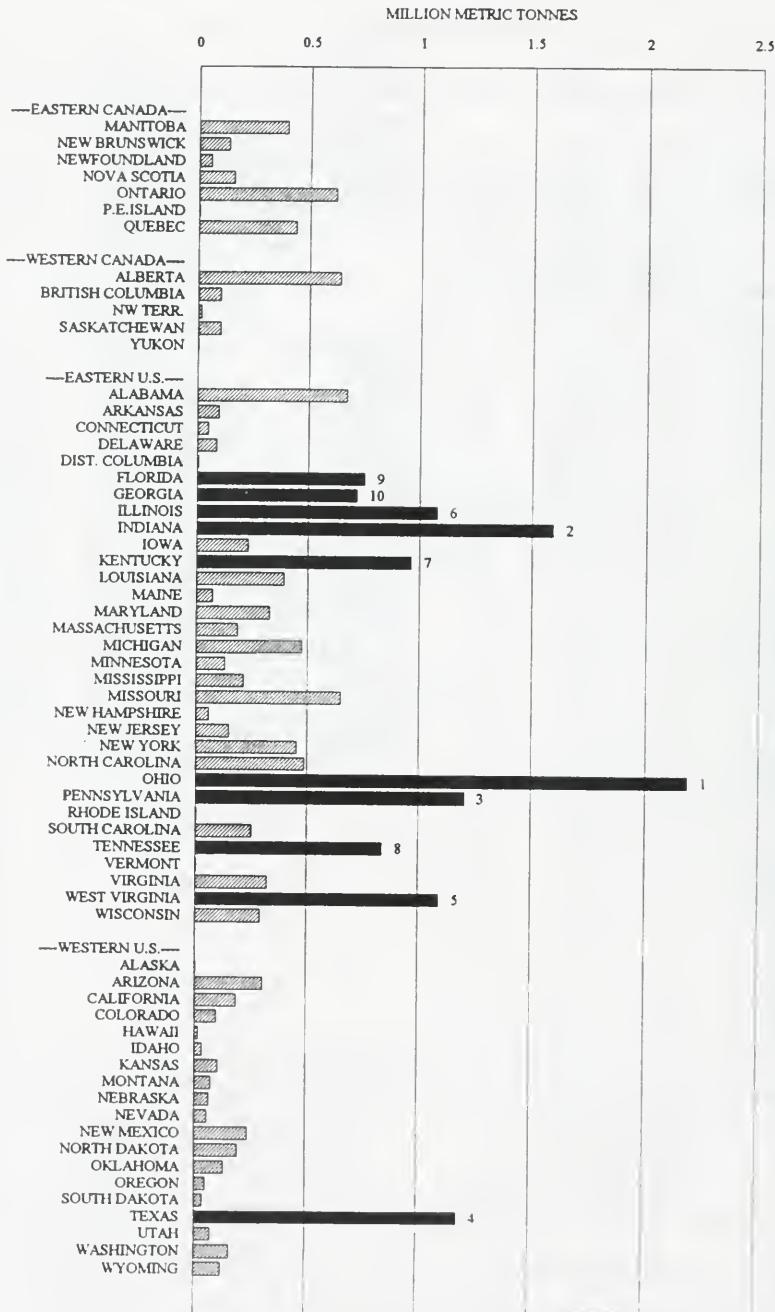
Sources:

U.S.: U.S. EPA report, "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995.

Canada:

- All provinces and territories except Ontario: Environment Canada, Pollution Data Branch, October 1995.
- Ontario: Ontario MOEE, December 1995.

FIGURE D-6. CANADA AND UNITED STATES 1994 SO₂ EMISSIONS BY PROVINCE/TERRITORY AND STATE.



Solid bars = top 10 states/provinces.

TABLE D-7. CANADA AND UNITED STATES 1985 NO_x EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.
(1,000 metric tonnes)

EASTERN STATES/PROV.	NOx	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	NOx	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	85	0.4%	47	ALBERTA	419	1.8%	20
NEW BRUNSWICK	69	0.3%	50	BRITISH COLUMBIA	225	1.0%	37
NEWFOUNDLAND	40	0.2%	55	N.W. TERR.	7	0.0%	60
NOVA SCOTIA	71	0.3%	49	SASKATCHEWAN	174	0.8%	40
ONTARIO	665	2.9%	11	YUKON TERR.	6	0.0%	61
P.E.ISLAND	7	0.0%	59				
QUEBEC	275	1.2%	31				
total:	1,213	5.3%		total:	830	3.7%	
<hr/>							
UNITED STATES				UNITED STATES			
ALABAMA	467	2.1%	17	ARIZONA	296	1.3%	27
ARKANSAS	225	1.0%	38	CALIFORNIA	1,421	6.3%	2
CONNECTICUT	148	0.6%	44	COLORADO	290	1.3%	29
DELAWARE	65	0.3%	53	IDAHO	83	0.4%	48
DIST. COLUMBIA	19	0.1%	58	KANSAS	376	1.7%	24
FLORIDA	734	3.2%	7	MONTANA	122	0.5%	45
GEORGIA	655	2.9%	12	NEBRASKA	157	0.7%	42
ILLINOIS	933	4.1%	4	NEVADA	90	0.4%	46
INDIANA	796	3.5%	6	NEW MEXICO	258	1.1%	34
IOWA	247	1.1%	36	NORTH DAKOTA	151	0.7%	43
KENTUCKY	523	2.3%	13	OKLAHOMA	441	1.9%	18
LOUISIANA	721	3.2%	8	OREGON	183	0.8%	39
MAINE	69	0.3%	51	SOUTH DAKOTA	62	0.3%	54
MARYLAND	282	1.2%	30	TEXAS	2,443	10.8%	1
MASSACHUSETTS	308	1.4%	26	UTAH	159	0.7%	41
MICHIGAN	697	3.1%	10	WASHINGTON	294	1.3%	28
MINNESOTA	322	1.4%	25	WYOMING	252	1.1%	35
MISSISSIPPI	262	1.2%	32	total:	7,080	31.2%	
MISSOURI	509	2.2%	14				
NEW HAMPSHIRE	67	0.3%	52				
NEW JERSEY	393	1.7%	23				
NEW YORK	702	3.1%	9				
NORTH CAROLINA	503	2.2%	15				
OHIO	1,004	4.4%	3				
PENNSYLVANIA	898	4.0%	5				
RHODE ISLAND	31	0.1%	56				
SOUTH CAROLINA	259	1.1%	33				
TENNESSEE	487	2.1%	16				
VERMONT	27	0.1%	57				
VIRGINIA	408	1.8%	21				
WEST VIRGINIA	440	1.9%	19				
WISCONSIN	397	1.7%	22				
total:	13,598	59.8%					
Eastern Canada + Eastern U.S.:	14,811	65.2%		Western Canada + Western U.S.:	7,910	34.8%	
Canada NO _x total:				2,043 kilotonnes	9.0%		
United States NO _x total:				20,678 kilotonnes	91.0%		
CANADA + U.S. NO_x TOTAL:	22,720 kilotonnes	100.0%					

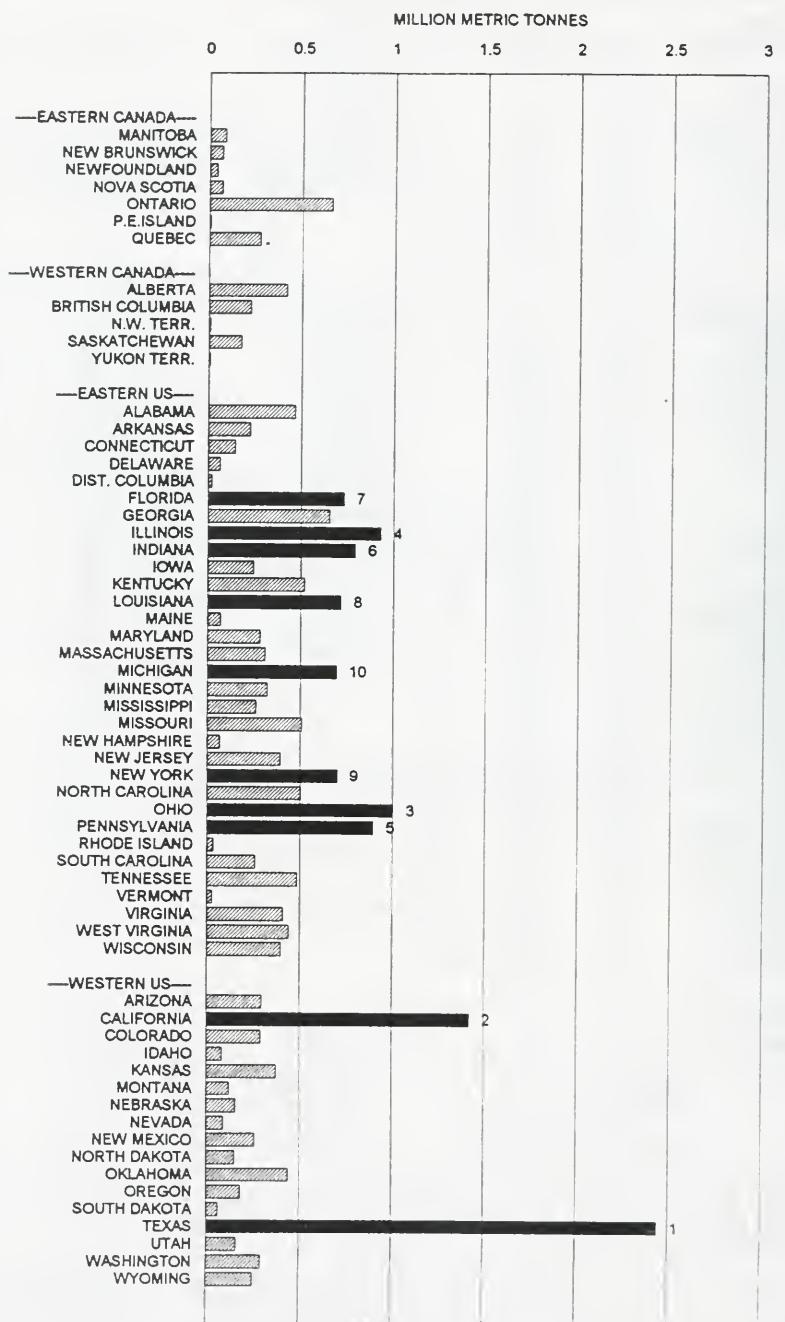
Sources:

- U.S.: National Inventory 2-Tier Report Generator Database, CHIEF BBS, U.S. EPA, May 1995.
- Canada (except Ontario): Environment Canada, Pollution Data Branch, October 1995.
- Ontario: Ontario MOEE, December 1995.

Note:

- (1) The U.S.EPA has published an updated value of 20.74 million metric tonnes for the U.S. 1985 NO_x emission total in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA 454/R-95-011, October 1995; however the U.S. data presented in this table is the latest available state breakdown for 1985.

**FIGURE D-7. CANADA AND UNITED STATES 1985 NO_x EMISSIONS
BY PROVINCE/TERRITORY AND STATE.**



Solid bars = top 10 states/provinces.

TABLE D-8. CANADA AND UNITED STATES 1990 NO_x EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.
 (1,000 metric tonnes)

EASTERN STATES/PROV.	NO _x	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	NO _x	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	74	0.3%	48	ALBERTA	487	2.1%	17
NEW BRUNSWICK	68	0.3%	52	BRITISH COLUMBIA	243	1.1%	37
NEWFOUNDLAND	43	0.2%	55	NW TERR.	9	0.0%	61
NOVA SCOTIA	73	0.3%	49	SASKATCHEWAN	143	0.6%	43
ONTARIO	653	2.9%	11	YUKON TERR.	6	0.0%	63
P.E.ISLAND	8	0.0%	62	total:	887	3.9%	
QUEBEC	301	1.3%	28				
total:	1,220	5.3%					
UNITED STATES				UNITED STATES			
ALABAMA	474	2.1%	18	ALASKA	18	0.1%	60
ARKANSAS	226	1.0%	38	ARIZONA	321	1.4%	26
CONNECTICUT	140	0.6%	44	CALIFORNIA	1,364	6.0%	2
DELAWARE	60	0.3%	53	COLORADO	290	1.3%	31
DIST. COLUMBIA	18	0.1%	59	HAWAII	37	0.2%	56
FLORIDA	792	3.5%	7	IDAHO	84	0.4%	47
GEORGIA	608	2.7%	12	KANSAS	371	1.6%	23
ILLINOIS	863	3.8%	5	MONTANA	136	0.6%	45
INDIANA	879	3.8%	4	NEBRASKA	171	0.7%	41
IOWA	265	1.2%	35	NEVADA	115	0.5%	46
KENTUCKY	561	2.5%	13	NEW MEXICO	256	1.1%	36
LOUISIANA	692	3.0%	10	NORTH DAKOTA	161	0.7%	42
MAINE	71	0.3%	50	OKLAHOMA	401	1.8%	21
MARYLAND	295	1.3%	30	OREGON	189	0.8%	40
MASSACHUSETTS	297	1.3%	29	SOUTH DAKOTA	59	0.3%	54
MICHIGAN	713	3.1%	9	TEXAS	2,309	10.1%	1
MINNESOTA	361	1.6%	25	UTAH	201	0.9%	39
MISSISSIPPI	274	1.2%	33	WASHINGTON	312	1.4%	27
MISSOURI	536	2.3%	14	WYOMING	266	1.2%	34
NEW HAMPSHIRE	68	0.3%	51	total:	7,059	30.9%	
NEW JERSEY	363	1.6%	24				
NEW YORK	718	3.1%	8				
NORTH CAROLINA	492	2.2%	16				
OHIO	1,004	4.4%	3				
PENNSYLVANIA	855	3.7%	6				
RHODE ISLAND	33	0.1%	57				
SOUTH CAROLINA	278	1.2%	32				
TENNESSEE	501	2.2%	15				
VERMONT	26	0.1%	58				
VIRGINIA	419	1.8%	20				
WEST VIRGINIA	423	1.8%	19				
WISCONSIN	398	1.7%	22				
total:	13,706	59.9%					
Eastern Canada + Eastern U.S.:	14,926	65.3%		Western Canada + Western U.S.:	7,946	34.7%	
Canada NO _x total:				2,106 kilotonnes	9.2%		
United States NO _x total:				20,766 kilotonnes	90.8%		
CANADA + U.S. NO_x TOTAL:				22,871 kilotonnes	100.0%		

Sources:

- U.S.: National Inventory 2-Tier Report Generator Database, CHIEF BBS, U.S.EPA, May 1995.

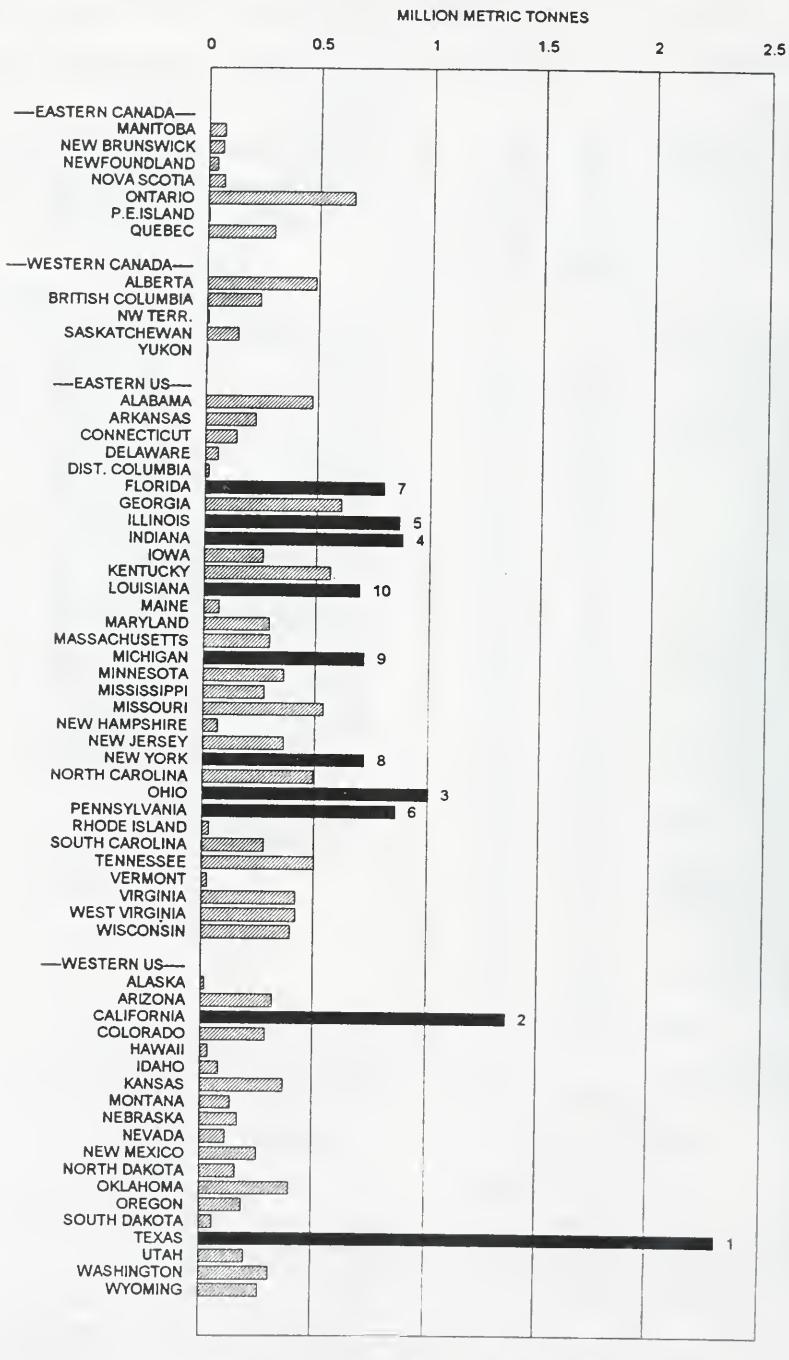
- Canada, except for Ontario: Environment Canada, Pollution Data Branch, October 1995.

- Ontario: Ontario MOEE, December 1995.

Note:

The U.S.EPA has published an updated value of 20.90 million metric tonnes for the U.S. 1990 NO_x emission total in the report "National Air Pollutant Emission Trends, 1990 - 1994", EPA-454/R-95-011, October 1995.

FIGURE D-8. CANADA AND UNITED STATES 1990 NO_x EMISSIONS
BY PROVINCE/TERRITORY AND STATE.



Solid bars = top 10 states/provinces.

TABLE D-9. CANADA AND UNITED STATES 1994 NO_x EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.
 (1000 metric tonnes)

EASTERN STATES/PROV.	NO _x	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	NO _x	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	66	0.3%	52	ALBERTA	499	2.1%	18
NEW BRUNSWICK	66	0.3%	51	BRITISH COLUMBIA	256	1.1%	37
NEWFOUNDLAND	39	0.2%	55	NW TERR.	9	0.0%	61
NOVA SCOTIA	68	0.3%	48	SASKATCHEWAN	167	0.7%	43
ONTARIO	524	2.2%	16	YUKON	6	0.0%	63
P.E.ISLAND	7	0.0%	62				
QUEBEC	278	1.2%	33				
total:	1,048	4.5%					
UNITED STATES				UNITED STATES			
ALABAMA	521	2.2%	17	ALASKA	25	0.1%	59
ARKANSAS	239	1.0%	38	ARIZONA	356	1.5%	25
CONNECTICUT	130	0.6%	46	CALIFORNIA	1390	5.9%	2
DELAWARE	57	0.2%	54	COLORADO	318	1.4%	28
DIST. COLUMBIA	18	0.1%	60	HAWAII	31	0.1%	56
FLORIDA	821	3.5%	7	IDAHO	100	0.4%	47
GEORGIA	609	2.6%	12	KANSAS	420	1.8%	22
ILLINOIS	908	3.9%	5	MONTANA	158	0.7%	44
INDIANA	917	3.9%	4	NEBRASKA	174	0.7%	41
IOWA	269	1.2%	35	NEVADA	130	0.6%	45
KENTUCKY	610	2.6%	11	NEW MEXICO	264	1.1%	36
LOUISIANA	706	3.0%	9	NORTH DAKOTA	170	0.7%	42
MAINE	68	0.3%	50	OKLAHOMA	417	1.8%	23
MARYLAND	300	1.3%	29	OREGON	210	0.9%	40
MASSACHUSETTS	273	1.2%	34	SOUTH DAKOTA	60	0.3%	53
MICHIGAN	731	3.1%	8	TEXAS	2369	10.1%	1
MINNESOTA	377	1.6%	24	UTAH	228	1.0%	39
MISSISSIPPI	291	1.2%	30	WASHINGTON	331	1.4%	27
MISSOURI	559	2.4%	13	WYOMING	279	1.2%	32
NEW HAMPSHIRE	68	0.3%	49	total:	7,429	31.7%	
NEW JERSEY	346	1.5%	26				
NEW YORK	655	2.8%	10				
NORTH CAROLINA	527	2.3%	14				
OHIO	1008	4.3%	3				
PENNSYLVANIA	830	3.5%	6				
RHODE ISLAND	30	0.1%	57				
SOUTH CAROLINA	288	1.2%	31				
TENNESSEE	525	2.2%	15				
VERMONT	25	0.1%	58				
VIRGINIA	431	1.8%	19				
WEST VIRGINIA	429	1.8%	21				
WISCONSIN	429	1.8%	20				
total:	13,995	59.8%					
Eastern Canada + Eastern U.S.:	15,043	64.3%		Western Canada + Western U.S.:	8,366	35.7%	
Canada NO _x total:				1,985 kilotonnes		8.5%	
United States NO _x total:				21,424 kilotonnes		91.5%	
CANADA + U.S. NO_x TOTAL:				23,409 kilotonnes		100.0%	

Sources:

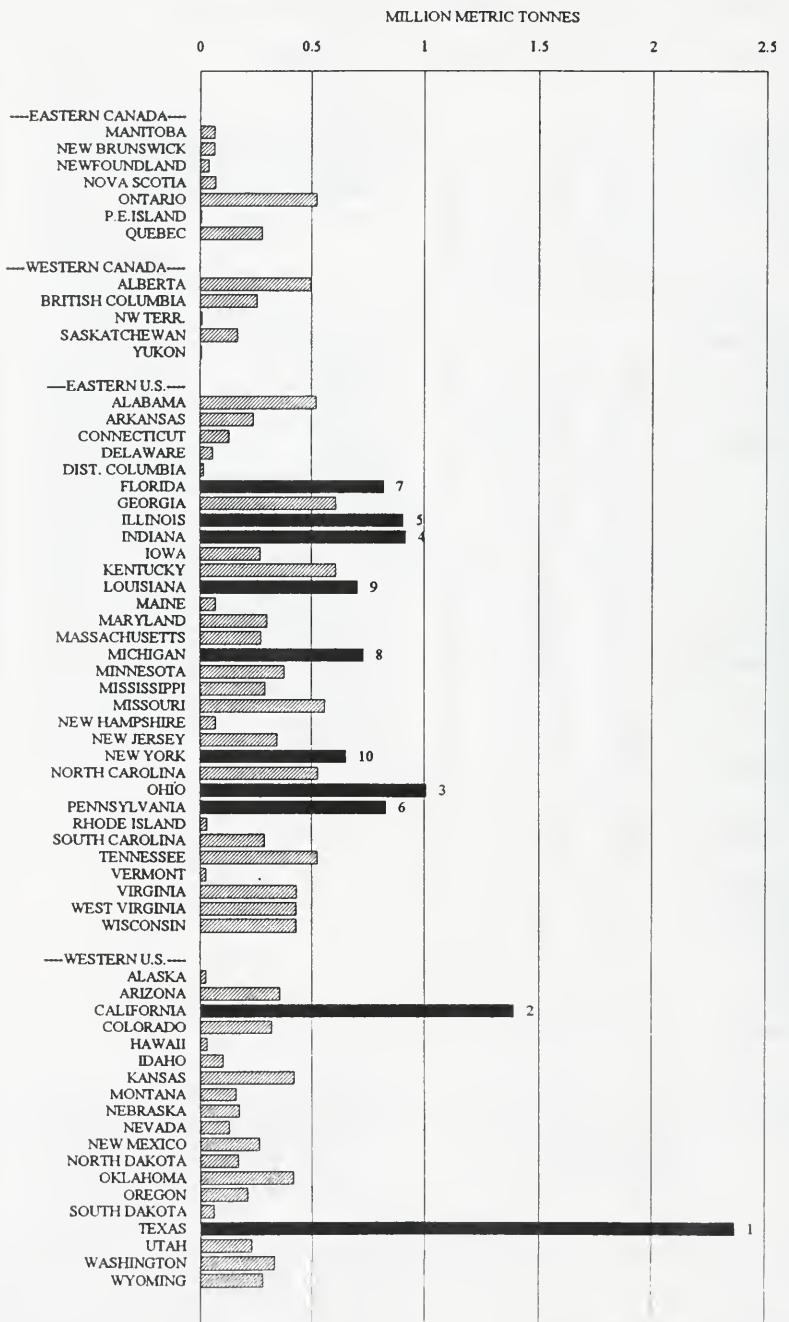
U.S.: U.S. EPA report, "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995.

Canada:

- All provinces and territories except Ontario: Environment Canada, Pollution Data Branch, October 1995.

- Ontario: Ontario MOEE, December 1995.

FIGURE D-9. CANADA AND UNITED STATES 1994 NO_x EMISSIONS BY PROVINCE/TERRITORY AND STATE.



Solid bars = top 10 states/provinces.

TABLE D-10. CANADA AND UNITED STATES 1985 VOC EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.

(1,000 metric tonnes)

EASTERN STATES/PROV.	VOC	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	VOC	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	98	0.4%	44	ALBERTA	780	3.0%	10
NEW BRUNSWICK	44	0.2%	56	BRITISH COLUMBIA	255	1.0%	32
NEWFOUNDLAND	49	0.2%	55	N.W. TERR.	8	0.0%	60
NOVA SCOTIA	81	0.3%	48	SASKATCHEWAN	153	0.6%	39
ONTARIO	888	3.4%	8	YUKON TERR.	2	0.0%	61
P.E.ISLAND	23	0.1%	59				
QUEBEC	409	1.6%	24				
total:	1,593	6.2%					
UNITED STATES				UNITED STATES			
ALABAMA	578	2.2%	18	ARIZONA	225	0.9%	37
ARKANSAS	226	0.9%	36	CALIFORNIA	1,832	7.1%	2
CONNECTICUT	214	0.8%	38	COLORADO	269	1.0%	31
DELAWARE	78	0.3%	50	IDAHO	141	0.5%	41
DIST. COLUMBIA	30	0.1%	58	KANSAS	238	0.9%	34
FLORIDA	902	3.5%	7	MONTANA	96	0.4%	45
GEORGIA	625	2.4%	15	NEBRASKA	133	0.5%	43
ILLINOIS	1,004	3.9%	4	NEVADA	76	0.3%	51
INDIANA	592	2.3%	17	NEW MEXICO	140	0.5%	42
IOWA	235	0.9%	35	NORTH DAKOTA	81	0.3%	49
KENTUCKY	356	1.4%	27	OKLAHOMA	335	1.3%	28
LOUISIANA	672	2.6%	12	OREGON	249	1.0%	33
MAINE	87	0.3%	46	SOUTH DAKOTA	85	0.3%	47
MARYLAND	300	1.2%	30	TEXAS	2,985	11.6%	1
MASSACHUSETTS	437	1.7%	23	UTAH	141	0.5%	40
MICHIGAN	789	3.1%	9	WASHINGTON	363	1.4%	26
MINNESOTA	394	1.5%	25	WYOMING	62	0.2%	54
MISSISSIPPI	309	1.2%	29	total:	7,452	28.9%	
MISSOURI	493	1.9%	21				
NEW HAMPSHIRE	73	0.3%	52				
NEW JERSEY	632	2.5%	13				
NEW YORK	1,048	4.1%	3				
NORTH CAROLINA	705	2.7%	11				
OHIO	904	3.5%	6				
PENNSYLVANIA	941	3.6%	5				
RHODE ISLAND	72	0.3%	53				
SOUTH CAROLINA	631	2.4%	14				
TENNESSEE	554	2.1%	19				
VERMONT	41	0.2%	57				
VIRGINIA	616	2.4%	16				
WEST VIRGINIA	547	2.1%	20				
WISCONSIN	467	1.8%	22				
total:	15,555	60.3%					
Eastern Canada + Eastern U.S.:	17,147	66.5%		Western Canada + Western U.S.:	8,650	33.5%	
Canada VOC total:				2,790 kilotonnes	10.8%		
United States VOC total:				23,007 kilotonnes	89.2%		
CANADA + U.S. VOC TOTAL:				25,797 kilotonnes	100.0%		

Sources:

- U.S.: National Inventory 2-Tier Report Generator Database, CHIEF BBS, U.S.EPA, May 1995.

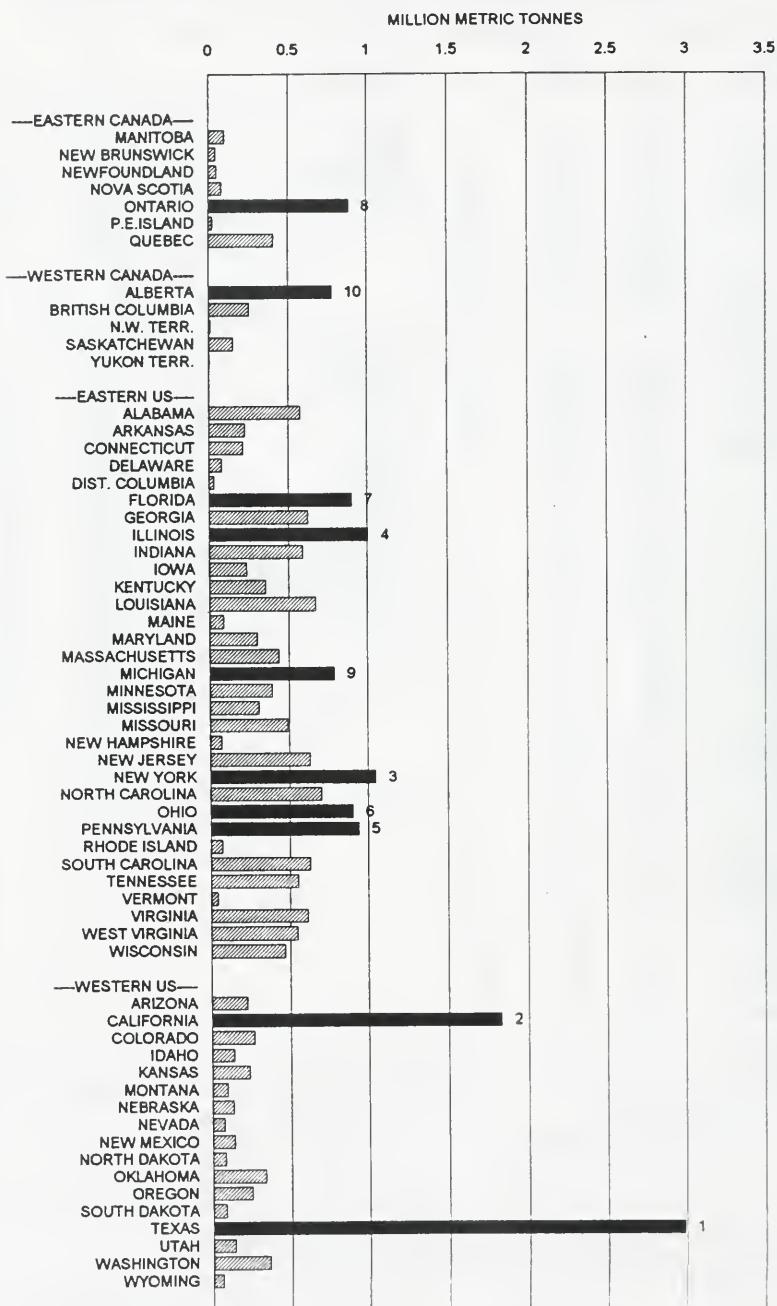
- Canada (except Ontario): Environment Canada, Pollution Data Branch, October 1995.

- Ontario: Ontario MOEE, December 1995.

Note:

(1) The U.S. EPA has published an updated value of 23.40 million metric tonnes for the U.S. 1985 VOC emission total in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA 454/R-95-011, Oct. 1995; however, the U.S. data presented in this table is the latest available state breakdown for 1985

FIGURE D-10. CANADA AND UNITED STATES 1985 VOC EMISSIONS
BY PROVINCE/TERRITORY AND STATE.



Solid bars = top 10 states/provinces.

TABLE D-11. CANADA AND UNITED STATES 1990 VOC EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.
 (1,000 metric tonnes)

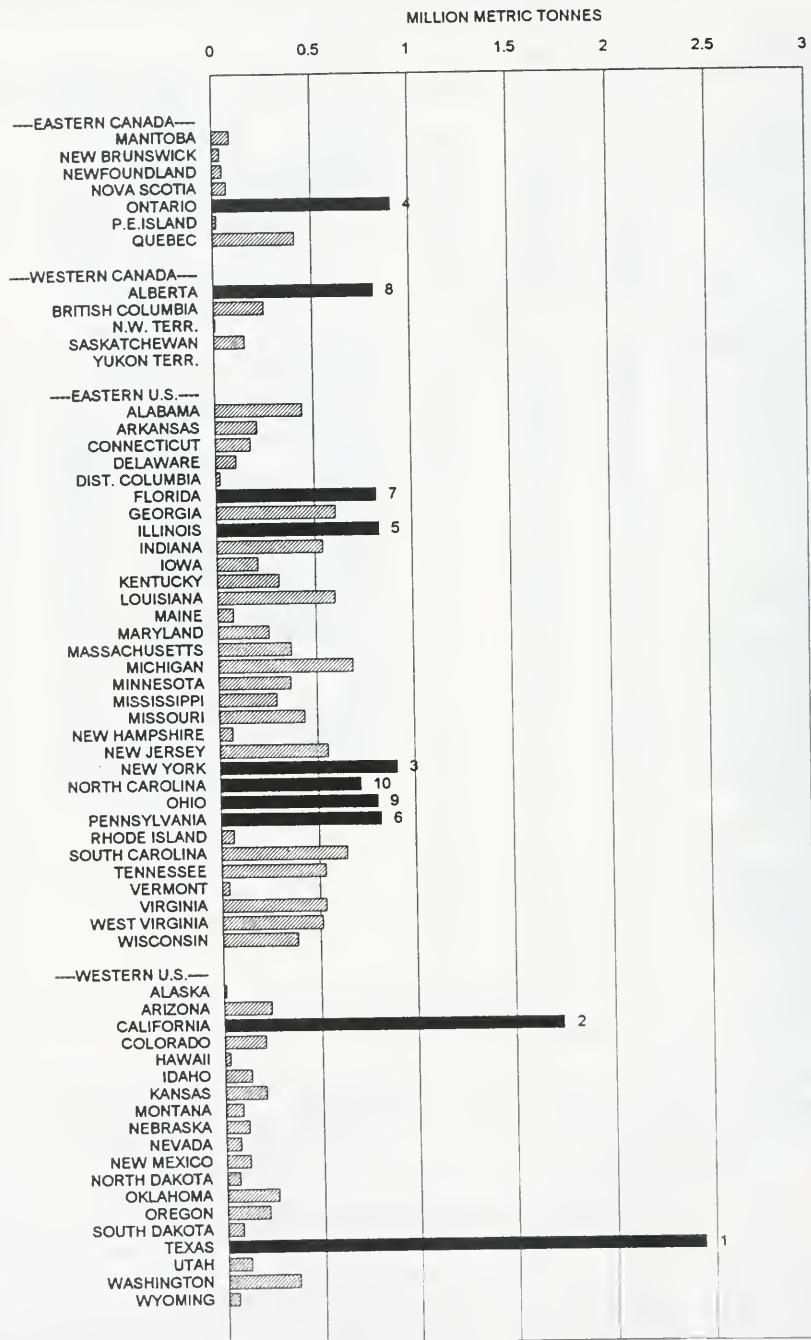
EASTERN STATES/PROV.	VOC	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	VOC	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	91	0.4%	45	ALBERTA	814	3.5%	8
NEW BRUNSWICK	41	0.2%	56	BRITISH COLUMBIA	257	1.1%	31
NEWFOUNDLAND	50	0.2%	55	N.W. TERR.	9	0.0%	62
NOVA SCOTIA	73	0.3%	50	SASKATCHEWAN	157	0.7%	39
ONTARIO	907	3.9%	4	YUKON TERR.	2	0.0%	63
P.E.ISLAND	20	0.1%	60		total:	1,239	5.3%
QUEBEC	417	1.8%	22				
	total:	1,600	6.8%				
UNITED STATES				UNITED STATES			
ALABAMA	445	1.9%	20	ALASKA	13	0.1%	61
ARKANSAS	214	0.9%	34	ARIZONA	244	1.0%	32
CONNECTICUT	180	0.8%	38	CALIFORNIA	1,743	7.4%	2
DELAWARE	106	0.5%	44	COLORADO	210	0.9%	36
DIST. COLUMBIA	23	0.1%	59	HAWAII	27	0.1%	58
FLORIDA	818	3.5%	7	IDAHO	136	0.6%	40
GEORGIA	607	2.6%	13	KANSAS	211	0.9%	35
ILLINOIS	829	3.5%	5	MONTANA	90	0.4%	46
INDIANA	539	2.3%	16	NEBRASKA	120	0.5%	42
IOWA	210	0.9%	37	NEVADA	76	0.3%	49
KENTUCKY	316	1.3%	27	NEW MEXICO	121	0.5%	41
LOUISIANA	600	2.6%	14	NORTH DAKOTA	69	0.3%	51
MAINE	81	0.3%	47	OKLAHOMA	264	1.1%	29
MARYLAND	260	1.1%	30	OREGON	218	0.9%	33
MASSACHUSETTS	371	1.6%	24	SOUTH DAKOTA	81	0.3%	48
MICHIGAN	685	2.9%	11	TEXAS	2,443	10.4%	1
MINNESOTA	366	1.6%	26	UTAH	119	0.5%	43
MISSISSIPPI	296	1.3%	28	WASHINGTON	368	1.6%	25
MISSOURI	435	1.9%	21	WYOMING	54	0.2%	54
NEW HAMPSHIRE	67	0.3%	52		total:	6,611	28.2%
NEW JERSEY	551	2.4%	15				
NEW YORK	908	3.9%	3				
NORTH CAROLINA	717	3.1%	10				
OHIO	803	3.4%	9				
PENNSYLVANIA	820	3.5%	6				
RHODE ISLAND	64	0.3%	53				
SOUTH CAROLINA	643	2.7%	12				
TENNESSEE	532	2.3%	18				
VERMONT	38	0.2%	57				
VIRGINIA	533	2.3%	17				
WEST VIRGINIA	512	2.2%	19				
WISCONSIN	384	1.6%	23				
	total:	13,954	59.6%				
Eastern Canada + Eastern U.S.:	15,554	66.5%		Western Canada + Western U.S.:	7,850	33.5%	
Canada VOC total:				2,839 kilotonnes	12.1%		
United States VOC total:				20,565 kilotonnes	87.9%		
				CANADA + U.S. VOC TOTAL:	23,404 kilotonnes	100.0%	

Sources:

- U.S.: National Inventory 2-Tier Report Generator Database, CHIEF BBS, U.S.EPA, May 1995.
- Canadian provinces/territories other than Ontario: Environment Canada, Pollution Data Branch, October 1995.
- Ontario: Ontario MOEE, December 1995.

Note: The U.S.EPA has published an updated value of 21.41 million metric tonnes for the U.S. 1990 VOC emission total in the report "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995

FIGURE D-11. CANADA AND UNITED STATES 1990 VOC EMISSIONS BY PROVINCE/TERRITORY AND STATE.



Solid bars = top 10 states/provinces.

TABLE D-12. CANADA AND UNITED STATES 1994 VOC EMISSIONS BY PROVINCE/TERRITORY AND STATE, WITH RANKINGS.

(1000 metric tonnes)

EASTERN STATES/PROV.	VOC	% of Can.+U.S.	Rank	WESTERN STATES/PROV.	VOC	% of Can.+U.S.	Rank
CANADA				CANADA			
MANITOBA	77	0.3%	49	ALBERTA	837	3.5%	6
NEW BRUNSWICK	39	0.2%	58	BRITISH COLUMBIA	263	1.1%	31
NEWFOUNDLAND	46	0.2%	56	NW TERR.	10	0.0%	62
NOVA SCOTIA	67	0.3%	52	SASKATCHEWAN	147	0.6%	39
ONTARIO	887	3.7%	4	YUKON	2	0.0%	63
P.E.ISLAND	19	0.1%	61				
QUEBEC	383	1.6%	23				
total:	1,519	6.4%					
UNITED STATES				UNITED STATES			
ALABAMA	456	1.9%	20	ALASKA	58	0.2%	54
ARKANSAS	237	1.0%	35	ARIZONA	247	1.0%	33
CONNECTICUT	176	0.7%	38	CALIFORNIA	1,689	7.1%	2
DELAWARE	105	0.4%	44	COLORADO	225	0.9%	36
DIST. COLUMBIA	23	0.1%	60	HAWAII	28	0.1%	59
FLORIDA	797	3.3%	9	IDAHO	109	0.5%	43
GEORGIA	611	2.6%	13	KANSAS	327	1.4%	28
ILLINOIS	845	3.5%	5	MONTANA	91	0.4%	45
INDIANA	570	2.4%	15	NEBRASKA	139	0.6%	40
IOWA	220	0.9%	37	NEVADA	86	0.4%	47
KENTUCKY	339	1.4%	27	NEW MEXICO	136	0.6%	41
LOUISIANA	582	2.4%	14	NORTH DAKOTA	78	0.3%	48
MAINE	88	0.4%	46	OKLAHOMA	273	1.1%	30
MARYLAND	258	1.1%	32	OREGON	240	1.0%	34
MASSACHUSETTS	368	1.5%	26	SOUTH DAKOTA	73	0.3%	50
MICHIGAN	703	3.0%	11	TEXAS	2,508	10.5%	1
MINNESOTA	375	1.6%	24	UTAH	134	0.6%	42
MISSISSIPPI	308	1.3%	29	WASHINGTON	374	1.6%	25
MISSOURI	451	1.9%	21	WYOMING	55	0.2%	55
NEW HAMPSHIRE	73	0.3%	51	total:	6,870	28.9%	
NEW JERSEY	532	2.2%	18				
NEW YORK	904	3.8%	3				
NORTH CAROLINA	738	3.1%	10				
OHIO	806	3.4%	8				
PENNSYLVANIA	823	3.5%	7				
RHODE ISLAND	64	0.3%	53				
SOUTH CAROLINA	641	2.7%	12				
TENNESSEE	544	2.3%	16				
VERMONT	43	0.2%	57				
VIRGINIA	542	2.3%	17				
WEST VIRGINIA	523	2.2%	19				
WISCONSIN	413	1.7%	22				
total:	14,154	59.5%					
Eastern Canada + Eastern U.S.:	15,673	65.9%		Western Canada + Western U.S.:	8,129	34.2%	
Canada VOC total:				2,777 kilotonnes		11.7%	
United States VOC total:				21,023 kilotonnes		88.3%	
CANADA + U.S. VOC TOTAL:				23,801 kilotonnes		100.0%	

Sources:

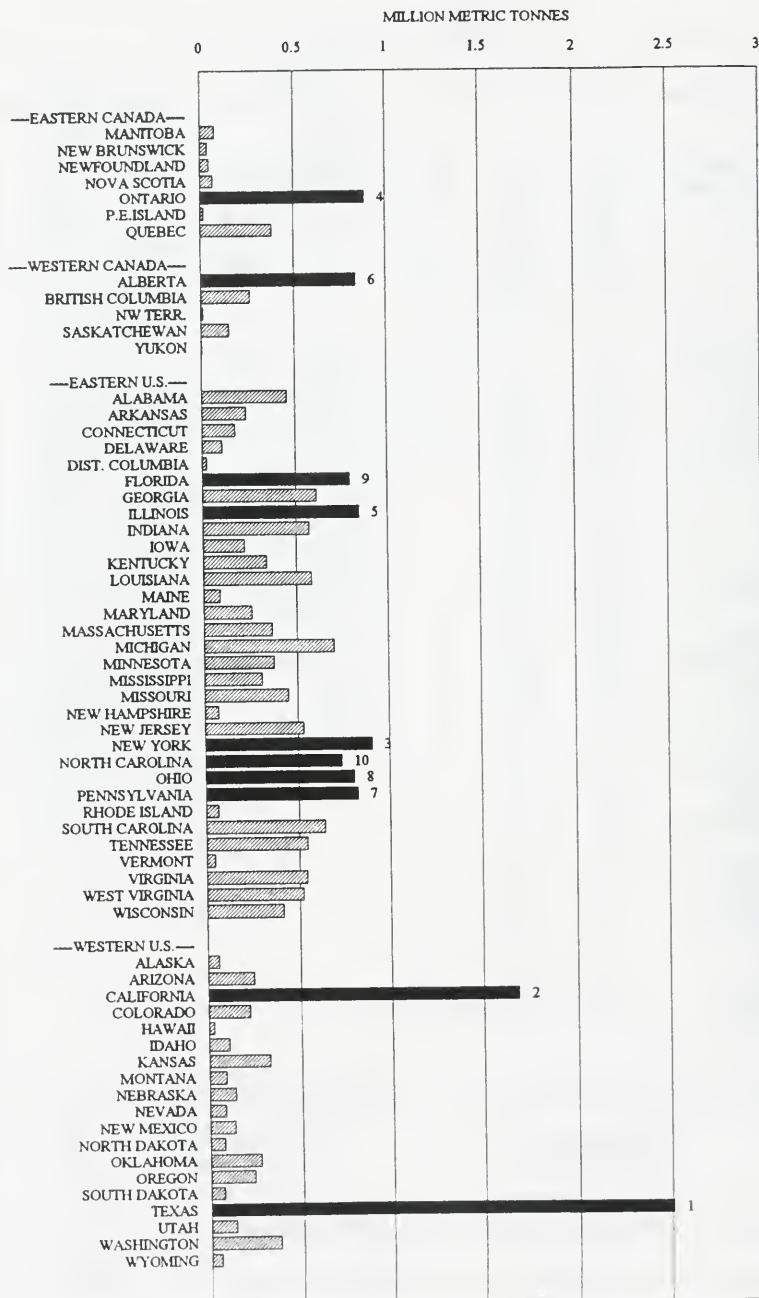
U.S.: U.S. EPA report, "National Air Pollutant Emission Trends, 1900 - 1994", EPA-454/R-95-011, October 1995.

Canada:

- All provinces and territories except Ontario: Environment Canada, Pollution Data Branch, October 1995.

- Ontario: Ontario MOEE, December 1995

FIGURE D-12. CANADA AND UNITED STATES 1994 VOC EMISSIONS BY PROVINCE/TERRITORY AND STATE.



Solid bars = top 10 provinces/states.

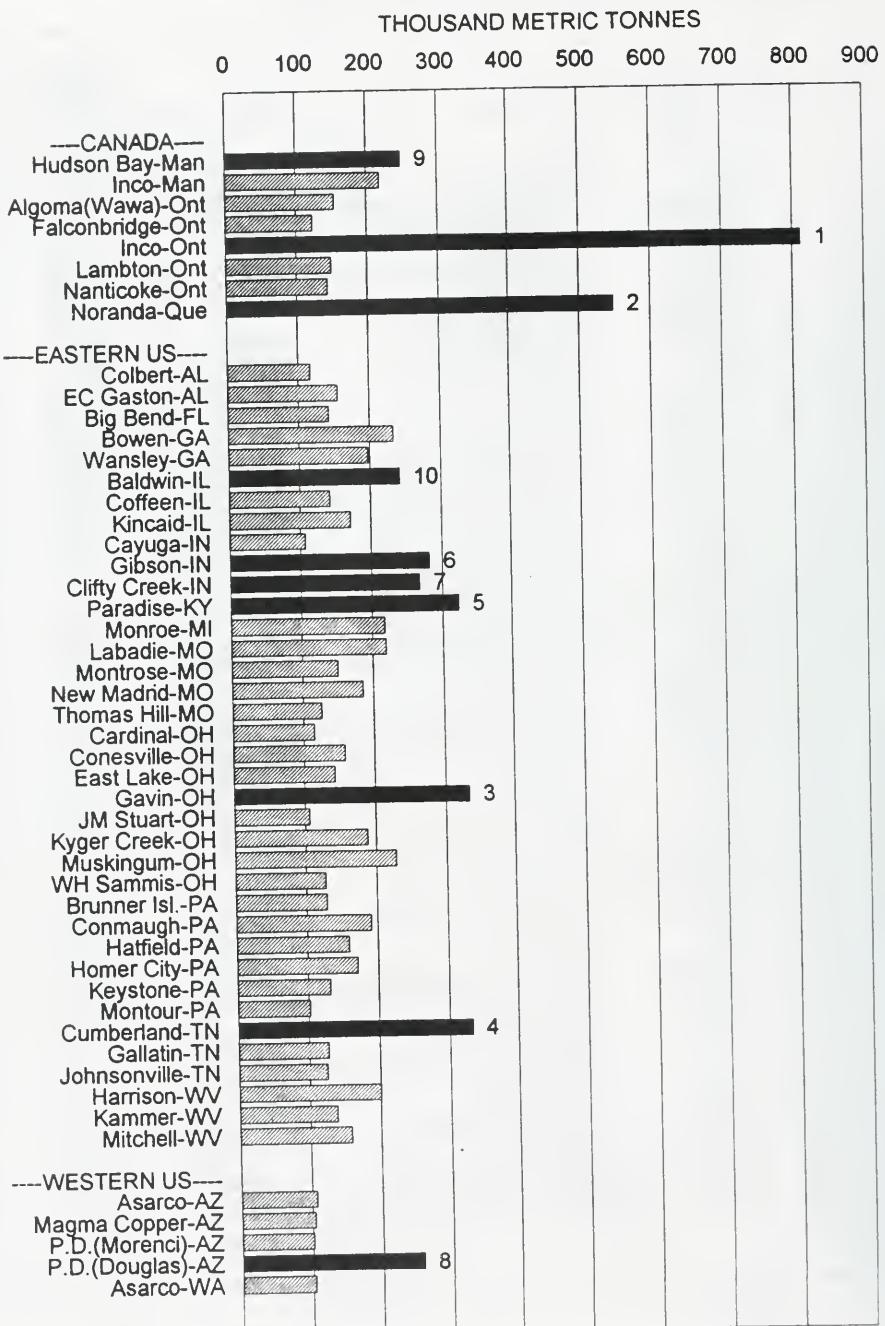
**TABLE D-13. CANADA & UNITED STATES 1980
TOP 50 SO₂ POINT SOURCES**

RANK	STATE/PROV.	COMPANY	PLANT	SO ₂ EMISSIONS (tonnes)
1*	ONTARIO	INCO		812,118
2*	QUEBEC	NORANDA		549,000
3	OHIO	OHIO POWER CO	GAVIN	334,195
4	TENNESSEE	TENNESSEE VALLEY AUTH	CUMBERLAND	333,815
5	KENTUCKY	TENNESSEE VALLEY AUTH	PARADISE	323,089
6	INDIANA	PUBLIC SERV	GIBSON	282,318
7	INDIANA	INDIANA-KETTUCKY ELEC	CLIFTY CREEK	268,294
8	ARIZONA	PELPHYS DODGE	DOUGLAS	258,059
9*	MANITOBA	HUDSON BAY M&S		248,387
10	ILLINOIS	ILLINOIS POWER CO	BALDWIN	241,338
11	GEORGIA	GEORGIA POWER CO	BOWEN	233,404
12	OHIO	OHIO POWER CO	MUSKINGUM	227,561
13*	MANITOBA	INCO		219,000
14	MISSOURI	UNION ELECTRIC CO	LABADIE	218,851
15	MICHIGAN	DETROIT EDISON CO	MONROE	217,341
16	W. VIRGINIA	MONONGAHELA POWER CO	HARRISON	200,845
17	GEORGIA	GEORGIA POWER CO	WANSLEY	197,079
18	PENNSYLVANIA	PENNSYLVANIA ELEC CO	CONMAUGH	190,863
19	OHIO	OHIO VALLEY ELEC CORP	KYGER CREEK	188,357
20	MISSOURI	ASSOCIATED ELEC COOP	NEW MADRID	185,777
21	ILLINOIS	COMMONWEALTH EDISON CO	KINCAID	171,709
22	PENNSYLVANIA	PENNSYLVANIA ELEC CO	HOMER CTY	171,522
23*	ONTARIO	ALGOMA STEEL (WAWA)		154,583
24	PENNSYLVANIA	WEST PENN POWER CO	HATFIELD	159,335
25	OHIO	COLUMBUS & S OH ELEC CO	CONESVILLE	158,920
26	W. VIRGINIA	OHIO POWER CO	MITCHELL	158,674
27	ALABAMA	ALABAMA POWER CO	E C GASTON	155,616
28	MISSOURI	KANSAS CITY PWR & LGT	MONTROSE	150,523
29*	ONTARIO	ONTARIO HYDRO	LAMBTON	149,774
30*	ONTARIO	ONTARIO HYDRO	NANTICOKE	144,001
31	OHIO	CLEVELAND ELEC ILLUM CO	EASTLAKE	143,724
32	ILLINOIS	CENTRAL ILL PUBLIC SER C	COFFEEN	142,870
33	FLORIDA	TAMPA ELECTRIC CO	BIG BEND	142,687
34	W. VIRGINIA	OHIO POWER CO	KAMMER	138,812
35	PENNSYLVANIA	PENNSYLVANIA ELEC CO	KEYSTONE	132,325
36	PENNSYLVANIA	PENNSYLVANIA PWR & LGT	BRUNNER ISL.	129,202
37	TENNESSEE	TENNESSEE VALLEY AUTH	GALLATIN	127,588
38	OHIO	OHIO EDISON CO	W H SAMMIS	127,509
39	MISSOURI	ASSOCIATED ELEC COOP	THOMAS HILL	126,767
40	TENNESSEE	TENNESSEE VALLEY AUTH	JOHNSONVILLE	125,696
41*	ONTARIO	FALCONBRIDGE		123,333
42	ALABAMA	TENNESSEE VALLEY AUTH	COLBERT	117,663
43	OHIO	CARDINAL OPERATING CO	CARDINAL	115,210
44	INDIANA	PUBLIC SERV CO	CAYUGA	107,354
45	ARIZONA	ASARCO INC	HAYDEN	107,023
46	OHIO	DAYTON PWR & LGT CO	J M STUART	106,518
47	ARIZONA	MAGMA COPPER SMELTER	SAN MANUEL	104,028
48	WASHINGTON	ASARCO INC		103,762
49	PENNSYLVANIA	PENNSYLVANIA PWR & LGT	MONTOUR	101,855
50	ARIZONA	PELPHYS DODGE CORP	MORENCI	101,196
TOTAL OF TOP 50 SOURCES:				9,729,468

* Canadian point source.

SOURCES: Ontario MOE, Environment Canada, and NAPAP (1980) Version 5.

**FIGURE D-13. CANADA AND UNITED STATES 1980
TOP 50 SO₂ POINT SOURCES.**



Solid bars = top 10 emitters.

**TABLE D-14. CANADA AND UNITED STATES 1985
TOP 50 SO₂ POINT SOURCES.**

RANK	STATE/PROV.	COMPANY	PLANT	SO ₂ EMISSIONS (tonnes)
1*	ONTARIO	INCO		695,000
2*	QUEBEC	NORANDA		436,000
3	OHIO	OHIO POWER CO	GAVIN	329,537
4	TENNESSEE	TENNESSEE VALLEY AUT	CUMBERLAND	313,254
5	ARIZONA	PHELPS DODGE - DOUGLAS		299,374
6	GEORGIA	GEORGIA POWER CO	BOWEN	276,968
7	INDIANA	PUBLIC SERV CO	GIBSON	276,027
8*	MANITOBA	HBMS		270,000
9	INDIANA	IND-KEN ELEC CORP	CLIFTY CREEK	243,683
10	MISSOURI	UNION ELECTRIC CO	LABADIE	241,486
11	OHIO	OHIO POWER CO	MUSKINGUM	229,915
12	GEORGIA	GEORGIA POWER CO	WANSLEY	225,575
13	WEST VIRGINIA	MONONGAHELA POWER CO	HARRISON	212,912
14	OHIO	OHIO VALLEY ELEC CORP	KYGER CREEK	202,053
15	ILLINOIS	COMMONWEALTH EDISON	KINCAID	193,684
16*	MANITOBA	INCO		188,000
17	ARIZONA	MAGMA COPPER SMELTER	SAN MANUEL	173,661
18*	ONTARIO	ONTARIO HYDRO	NANTICOKE	169,000
19	PENNSYLVANIA	PENNSYLVANIA ELEC CO	CONMAUGH	166,123
20	OHIO	OHIO EDISON CO	W H SAMMIS	163,596
21	PENNSYLVANIA	WEST PENN POWER CO	HATFIELD	146,132
22	OHIO	DAYTON PWR & LGT CO	J M STUART	144,865
23	ILLINOIS	CENTRAL ILL PUBLIC	COFFEEN	144,618
24	ALABAMA	ALABAMA POWER CO	E C GASTON	144,468
25	OHIO	CLEVELAND ELEC ILLUM	EASTLAKE	143,588
26	WEST VIRGINIA	OHIO POWER CO	KAMMER	142,460
27	MISSOURI	ASSOCIATED ELECTRIC	COOP	138,178
28	ILLINOIS	ILLINOIS POWER CO	BASTATE	137,387
29	FLORIDA	TAMPA ELECTRIC CO	BIG BEND	134,729
30	INDIANA	ALCOA GENERATING CORP		133,615
31	OHIO	COLUMBUS & S OH ELEC	CONESVILLE	128,437
32	OHIO	CARDINAL OPERATING CO	CARDINAL	127,482
33	ALABAMA	TENNESSEE VALLEY AUT	COLBERT	124,755
34	PENNSYLVANIA	PENNSYLVANIA POWER & LGT	BI SES	121,398
35*	ONTARIO	ONTARIO HYDRO	LAMBTON	118,000
36	GEORGIA	GEORGIA POWER CO	YATES	117,794
37	MICHIGAN	DETROIT EDISON CO	MONROE	117,003
38	WEST VIRGINIA	VIRGINIA ELEC & POWER	MT STORM	116,403
39	TENNESSEE	TENNESSEE VALLEY AUT	GALLATIN	116,393
40*	ONTARIO	ALGOMA STEEL (WAWA)		111,890
41	TEXAS	TEXAS UTILITIES	MOUNT PLEASANT	114,947
42	INDIANA	PUBLIC SERVICE CO	CAYUGA	112,649
43	KENTUCKY	TENNESSEE VALLEY AUT	PARADISE	110,675
44	PENNSYLVANIA	PENNSYLVANIA ELEC CO	KEYSTONE	107,826
45	KENTUCKY	LOUISVILLE GAS & ELEC	MILL CREEK	107,760
46	WISCONSIN	WIS ELECTRIC POWER	OAK CREEK	104,838
47	PUERTO RICO	CARIBBEAN GULF REFINING		104,246
48	PENNSYLVANIA	PENNSYLVANIA ELEC CO	HOMER CTY	101,360
49	PENNSYLVANIA	PENNSYLVANIA PWR & LGT	MONTOUR	97,377
50	MISSOURI	ASSOCIATED ELEC COOP	THOMAS HILL	96,404

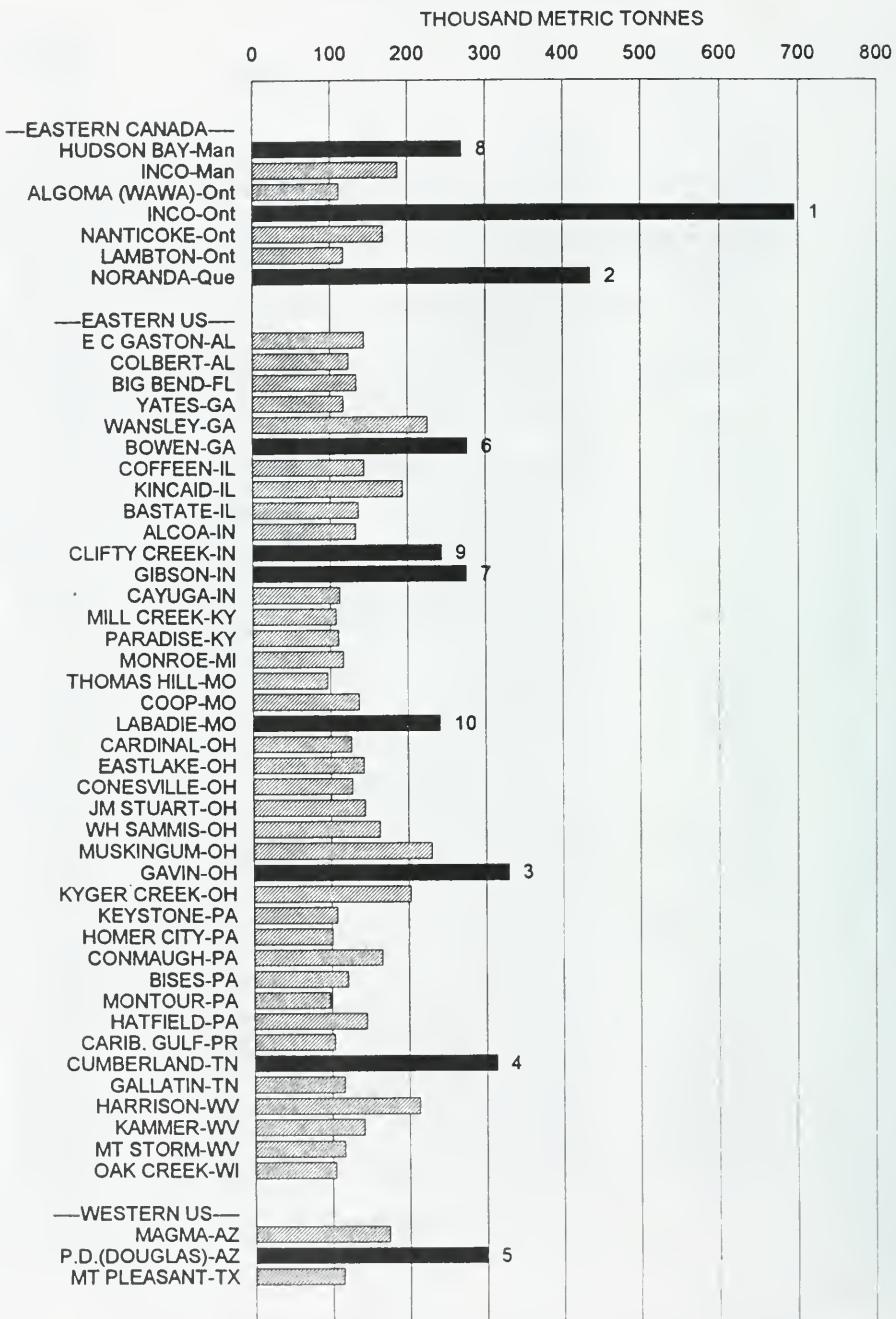
TOTAL OF TOP 50 SOURCES:

8,973,525

* Canadian point source.

SOURCES: Ontario MOE, Environment Canada, and U.S. NEDS Point Sources (greater than 907 metric tonnes/year).

**FIGURE D-14. CANADA AND UNITED STATES 1985
TOP 50 SO₂ POINT SOURCES.**



Solid bars = top 10 emitters.

